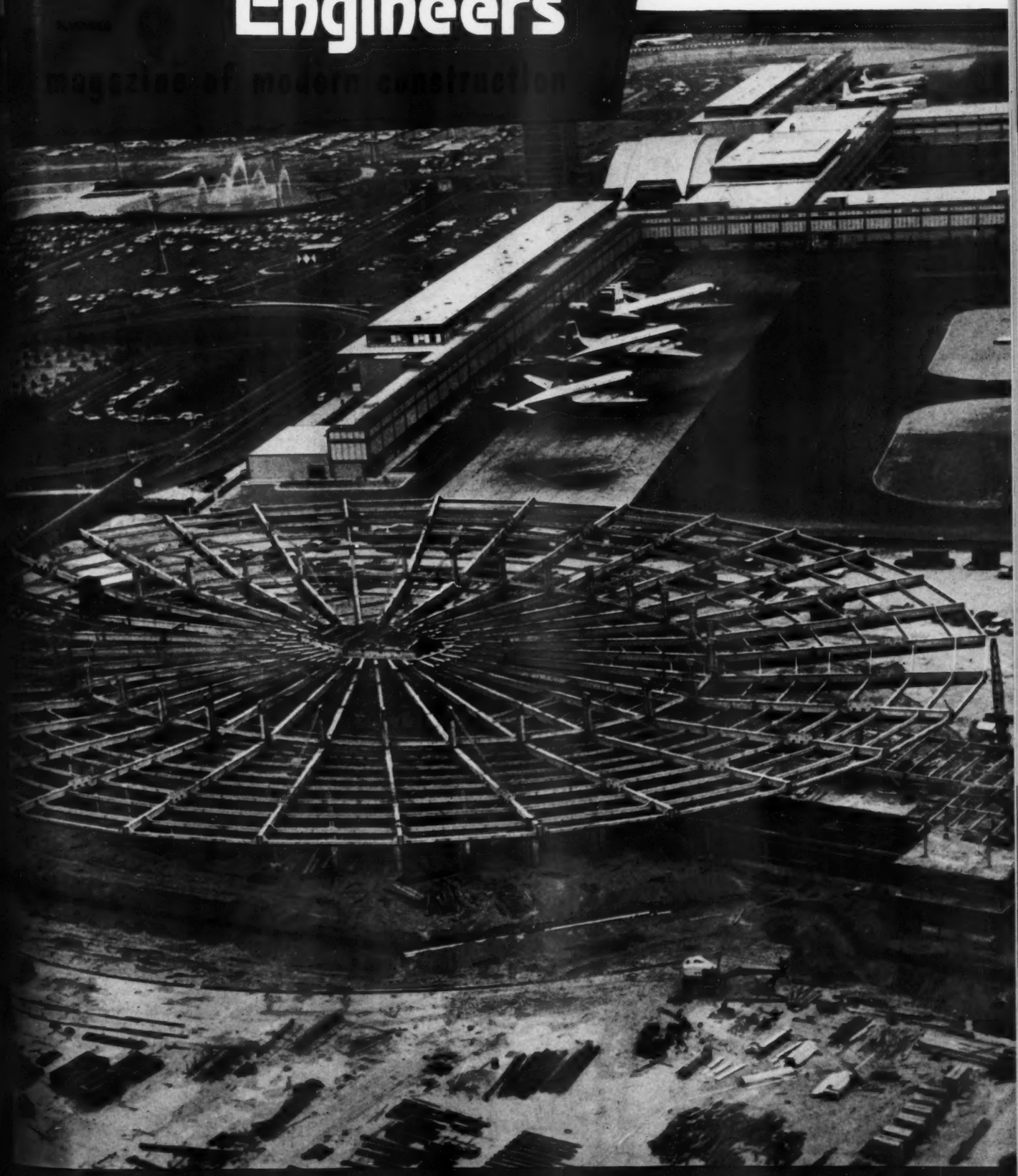
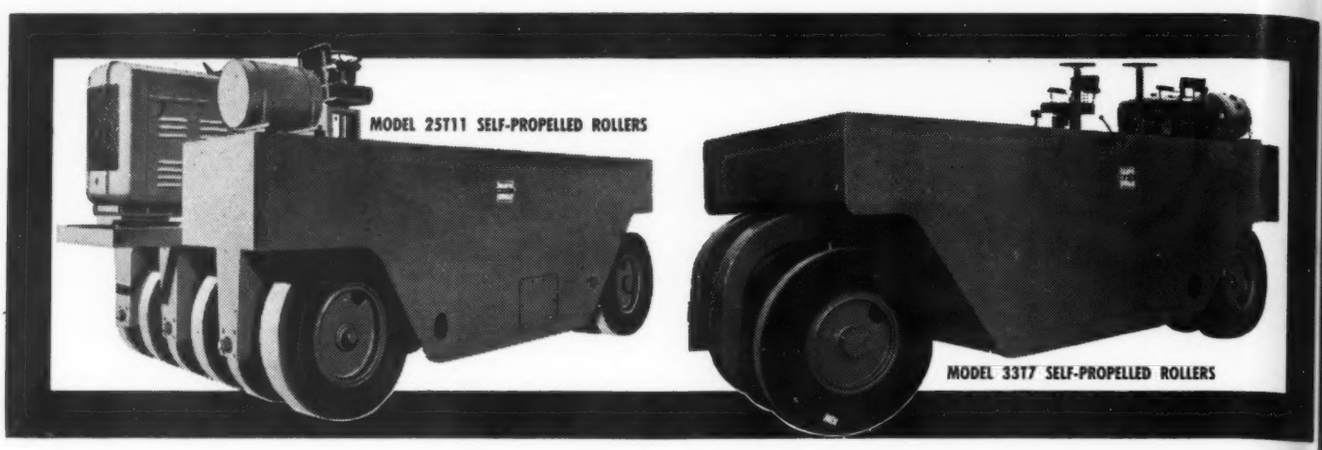
Contractors and Engineers

DECEMBER 1959

A Buttenheim Publication





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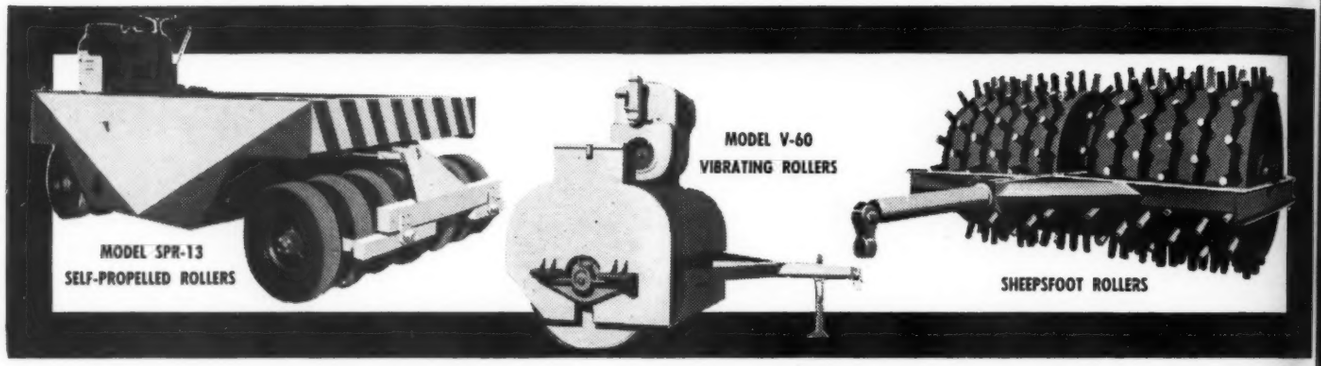

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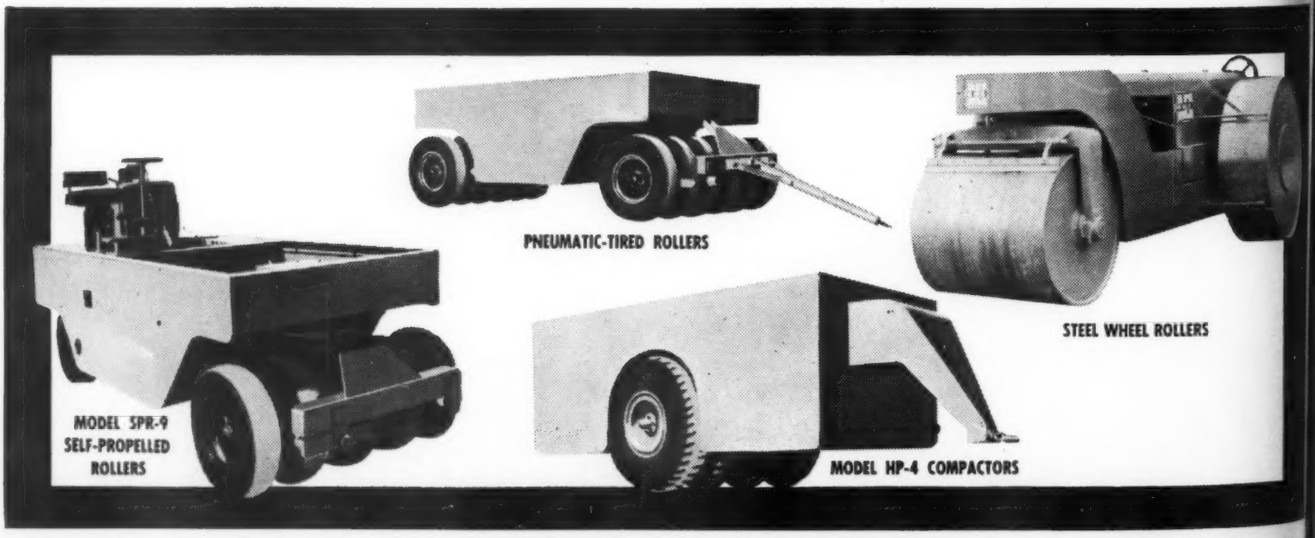

For more facts, use Request Card at page 18 and circle No. 251

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magazine of modern construction

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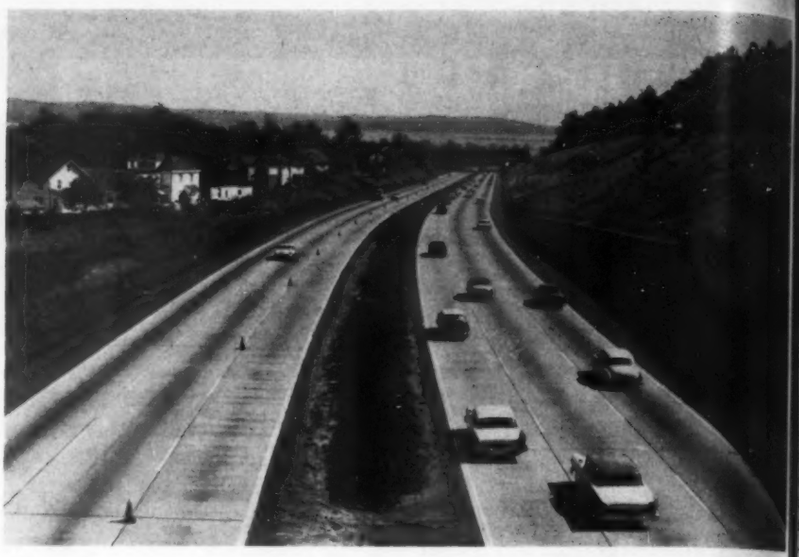
Editorial

Everyone favors highways



Like the old wheeze that everyone is against sin, so it is that everyone practically is in favor of highways. We inserted the qualifying word "practically," since we all know that the railroads have long looked with a jaundiced eye at competing transportation systems using the country's highways. Certainly the railroads need help in many ways if they are to continue to serve their basic function of hauling passengers and freight. But they did not get any help in the New Jersey election last month, when a proposal to let the state use excess New Jersey Turnpike revenues to help the commuter railroads was decisively defeated. Highway users opposed this as a further raid on highway funds.

So it is with all groups of highway users, government administrators, legislators, and anyone who has any kind of a stake in the road program. They are all in favor of highways in general, but after that their opinions diverge sharply as to the type of highways to be built, where they are to go, and how they are to be financed. These differences range all the way from the Chief Executive, whose pay-as-you-go interstate program has been criticized, down to the smallest proprietor of a roadside stand whose business will be shut off by a limited-access highway.

In highway circles, the Bragdon committee is regarded as a bogeyman that wants to emphasize the construction of roads linking cities while spending as little as possible on urban highways. Maj. Gen. John S. Bragdon is President Eisenhower's advisor on public works planning. According to reports, the President is concerned with the defense features of the Interstate Highway System, and to meet this defense need an increase in the minimum vertical clearance for bridges from 14 feet to 17 feet has been recommended. Many bridges already constructed to smaller clearances may have to be modified. This higher standard for bridges under construction or to be constructed will increase the cost of the Interstate program by about $300 million.

Traffic Commissioner T. T. Wiley of New York City says that the Interstate program will not solve the crisis in highway transportation, since the real need is for home-to-market and home-to-work roads in the rapidly growing urban and suburban areas. He scored the emphasis on road construction in rural areas where he felt that traffic congestion is negligible.

As for financing, opinions vary from the conservative policy of Sen. Harry F. Byrd (D., Va.) who sponsored the pay-as-you-go amendment to the free wheeling Sen. Pat McNamara (D., Mich.) who told the recent convention of the American Association of State Highway officials that this amendment should be repealed and that the needed funds could be obtained by borrowing. Between these two extremes are all variations on the fund-raising theme. Some favor broadening the tax base to include other than highway users who may receive benefits, such as adjoining landowners, or even the Department of Defense, which wants higher bridge clearances. Others favor economies in standards of construction or by decreasing right-of-way widths.

There is a mighty challenge in the year ahead, when Congress again convenes, to shape these different opinions and the needs of the many factions into a cohesive, workable, soundly financed highway program that will provide continuity until the goal is achieved. But this challenge must be accepted and resolved or else the highway program will founder.

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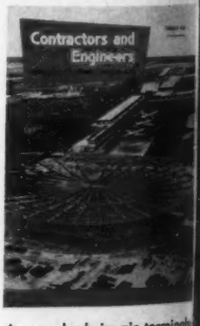

A new look in air terminals the Pan American World Airways building at New York International Airport has 32 roof supports fanning out from a central core. Four jet planes will be able to move under the roof, which is 4 acres in area. Page

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Experience Counts

On balance, the 50's have been good to the construction business. The value of all new construction in 1950 was under 30 billion dollars. In 1959 it will exceed 54 billion. The established, experienced contractor has many more opportunities for profit at the end of the decade than he had at the beginning.

But, if construction is a more lucrative business in 1959 than it was in 1950, it is also far more risky—certainly for the inexperienced. The number of construction failures has risen alarmingly in the last decade. In 1950 Dun & Bradstreet reported 912 contractor failures with $25,651,000 in liabilities. In 1958, 2,162 contractors failed and liabilities were $115,115,000 — four and a half times the 1950 figure.

In the first 9 months of this year, 1,551 contractors closed their doors permanently. This was slightly under the 1,634 failures for the same period in 1958. Liabilities, however, were higher—$92,162,000 compared with $80,803,000—and appeared headed for a record again in 1959.

The picture is not quite as bad as these figures suggest, since a much bigger construction industry is likely to be bigger in every way—including volume of liabilities. But, as the accompanying chart illustrates, during the last decade liabilities have been growing at a much faster rate than the industry's output.

The explanation of this becomes apparent when the underlying causes of failure are analyzed.

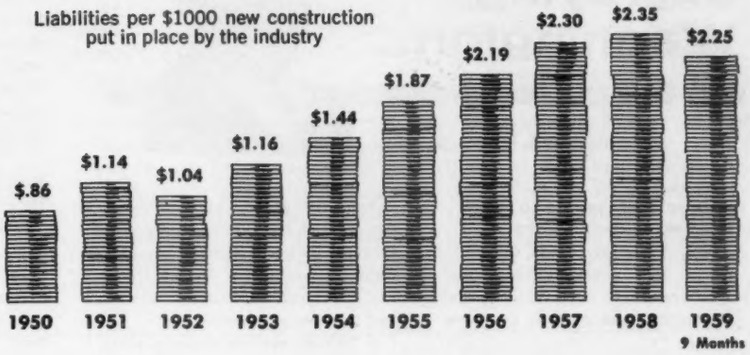
Experience, it appears, was the crucial factor in 51 per cent of 1958 failures. Of these, 8.4 per cent were attributed to lack of experience in the line and another 19.8 per cent to lack of managerial experience. Unbalanced experience was judged to be the underlying of 22.8 per cent.

Almost all of the remaining failures (28.8 per cent) was traced to downright incompetence. Here are the unhappy results of deficiencies in experience and know-how and the per cent of failures attributed to each:

Apparent Causes	Per Cent
Inadequate Sales	38.5
Heavy Operating Expenses	9.1
Receivables Difficulties	17.6
Inventory Difficulties	2.0
Excessive Fixed Assets	5.4
Poor Location	0.3
Competitive Weakness	28.8
Other	7.0

Other underlying causes of failure were neglect (3.7 per cent of cases) and fraud (1.9 per cent).

The D&B analysis shows, incidentally, that contractors are a healthy lot. Only 2 per cent of 1958 failures were attributed to neglect of business because of poor health. The explanation for this may lie in another D&B observation: that only 1.1 per cent of failures can be traced to bad habits. This dovetails very nicely with yet another finding: that only four-tenths of one per cent of failures were caused by marital difficulties.



Surveying Washington..

by E. E. Halmos, Jr.

Supreme Court to rule on cases important to construction

The U. S. Supreme Court, this term, will rule on a number of matters of major immediate importance to the construction industry. Here are a few of them.

1. Does a subcontractor's mechanic's lien supersede a federal tax lien on the prime contractor or owner? There are two cases before the court now. In one, a New York court disallowed the sub's claim on the ground that the federal taxing power is superior to state laws. In the other, a North Carolina court has held that the mechanic's lien superseded the federal claims.

2. Who has the responsibility for ascertaining and guarding against dangerous working conditions? Construction company employees, who had been seriously injured when a crane boom came too near a 30,000-volt power line during a street paving job, are suing the Potomac Electric Power Co. on the grounds that the company should have taken precautions in view of the planned construction work. A Maryland court has held that the power company has every right to expect that the contractor and his foremen would note the line and take proper precautions.

3. Do some contractor-union agreements have the effect of forcing a subcontractor's employees into another union? This case arose on

Travis Air Force Base in California where a four-contractor joint venture hired an engineering firm to prepare earthmoving computations and drawings. Under a state-wide agreement, subs were to deal with the same unions as the primes, and operating engineers struck the job to force engineering firm employees to join their union. A California court held the strike illegal, but said the contract clause was not necessarily illegal. The engineering firm appealed to the high court, charging that the agreement forced it to interfere illegally with the free choice of its employees as to union representation.

Broader base sought for reclamation projects

Look for legislation at the next session of Congress aimed at broadening the base for determining reclamation project feasibility. It could mean a lot more construction work in this field.

The tipoff came in recent talks by Reclamation Commissioner Floyd Dominy, who's working for inclusion of such factors as flood control, pollution and salinity control, fish and wildlife benefits, etc., in considering feasibility of projects. Basically, at present, only "reimburseables" such as power, municipal and industrial water, and irrigation are considered in judging a new project.

Waterways operators make concessions to construction

Waterways operators, fighting on a number of fronts to prevent further federal interference in their affairs, have made some concessions to highway work that will affect construction operations. The concession: at a recent hearing on bridges over the Upper Mississippi River, the American Waterways Operators Association agreed to criteria calling for 55-foot vertical clearances for highway and other bridges. In the past, 63-foot clearances have been demanded.

The reason for this is a growing, but not yet coordinated, campaign in Congress and among highway en-

thusiasts for imposition of some sort of tolls on users of inland waterways to help repay heavy government expenditures. It moves to give surface transportation, in general, equal consideration in evaluating heights and widths of bridge spans being designed.

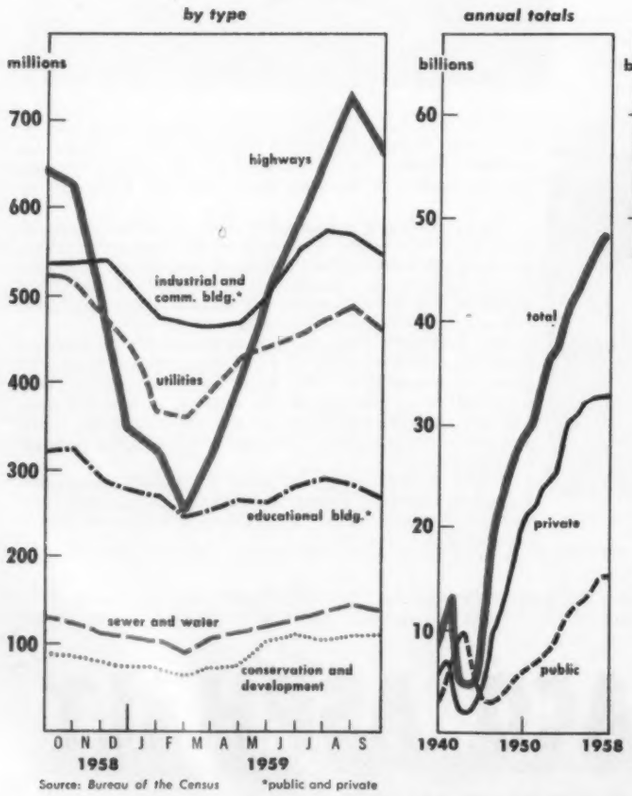
Highway people in particular have been complaining that arbitrary preference for sometimes almost non-existant navigation on many inland waterways often materially increases the cost of bridges and approaches as much as 27 per cent in some instances. Highway men contend that this amounts to a subsidy for water navigation at the expense of the highway trust fund.

River boat men argue that their is the oldest form of navigation and

Industry Trends

DOLLAR VALUE OF NEW CONSTRUCTION

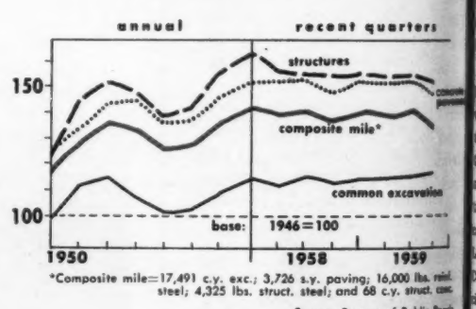
Recent Monthly Trends



Source: *Bureau of the Census* *public and private

AVERAGE BID PRICES

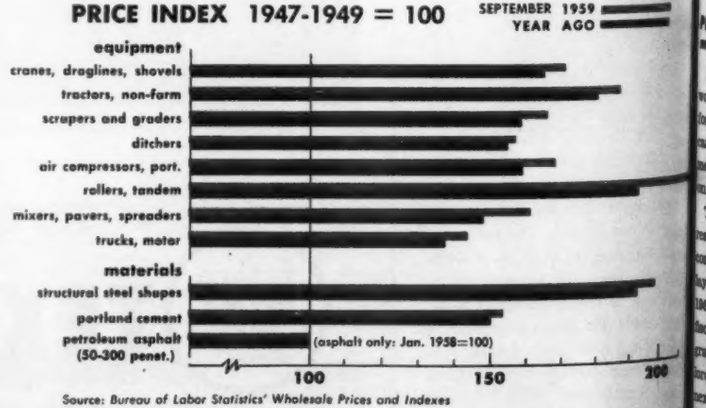
Federal Aid Highway Construction



*Composite mile=17,491 c.y. exc.; 3,726 s.y. paving; 16,000 lbs. reinf. steel; 4,325 lbs. struct. steel; and 68 c.y. struct. conc.

Source: *Bureau of Public Roads*

PRICE INDEX 1947-1949 = 100



Source: *Bureau of Labor Statistics' Wholesale Prices and Indexes*

existence is a big factor in holding down freight rates on railroads and trucks. And, anyway, they say they have enough interference from government right now in the form of Interstate Commerce Commission and other agency controls.

Three big developments concerning labor unions

There are a number of new developments on the labor front.

1. The U. S. Board of Parole, by publication in the October 20 issue of the "Federal Register", set up rules by which labor leaders with criminal records—thus prohibited from serving in official capacities with labor organizations—may apply for exemptions. In brief, the new rules provide that such a labor leader must submit an application to the parole board, accompanied by an affidavit as to his recent activities. The board will then set up a hearing, to which the prosecuting officials and Labor Department

representatives will be invited. Then, if the parole board decides that the applicant's services wouldn't be contrary to the act, an exemption will be issued. Otherwise, the applicant will have to wait another whole year for a new hearing.

2. A District of Columbia grand jury has indicted Maurice A. Hutcheson, carpenter union chief, on charges of contempt of Congress for his refusal to testify on disposal of certain union funds. Penalty, on conviction, is a year in jail and $1,000 in fines.

3. A labor union cannot refuse to furnish men and otherwise cooperate with a contractor, then strike the job to get newly hired employees to join the union. That, said an NLRB decision, is an economic—not a jurisdictional—strike, and thus is illegal. The case involved plumber's local in St. Louis and the General Refrigeration Co., which, according to NLRB's decision, resulted when plumber local refused to refer men, and General Refrigeration went outside of the union to get help.

Plans on missile-base work may be altered to fit budget

If you are pushing for missile-base work, keep in mind that programming for fiscal year 1960, now going on, cannot be made firm by the Department of Defense until it finishes work on its 1961 fiscal year budget.

That sounds paradoxical, but the reasons are readily understandable to construction. The heaviest cash outlay for programs started in fiscal year 1960 will not actually come due until fiscal year 1961 or later. Thus, programs to be started now must be tailored with an eye to their effect on next year's budget.

The budget review will be wrapped up before the middle of this month, to be ready for the President's annual budget message to Congress at the end of January.

Streamlining in sight for Bureau of Reclamation

Incidentally, those rumors about reorganization within the Bureau of Reclamation are true enough—and the effect on construction operations, BuRec officials hope, will be to make them smoother.

What's happening is a streamlining of bureau functions and offices, involving no major personnel changes, with a rearrangement of responsibilities for better administration. Dominy, for instance, has said he can't see why operations that happen to spread out geographically should be tied up by arbitrary district and division lines.

An example of this thinking is the creation of the new post, at Denver, of chief, Division of Power Operations and General Engineering, to which W. H. Taylor, former head of Region 3 at Boulder City, has been appointed. His job will be to coordinate power operations, the small loans program, and special engineering assignments.

Expense-account men: check this tax deduction case

On legal matters involving taxes, take note of a recent decision of the Tax Court concerning expense accounts. Said the court, in effect: if your employer will reimburse you for certain expenses, have him do so.

The matter involved an employee of the Internal Revenue Service, who used his car to get to his job. Although he could have submitted an expense account for such expenditures, he chose instead to take them as a deduction on his income tax. The Tax Court said he could not do that.

For more facts, circle No. 253→

Cuba plans to build with native contractors

Unless American or foreign industry expands existing plants or builds new facilities in Cuba, U. S. construction firms are going to find slim pickings on that Caribbean island.

The present government is encouraging long-range foreign capital investments and at the same time trying to strengthen its own internal monetary position by a vigorous campaign of "buy Cuban." If private investors outside Cuba are not available, the country plans to get along by itself. Already, the people have been urged to save their money to help in an industrialization program.

To implement this policy, the Ministry of Public Works (MOP) is going out of the force-account building business, and will act as the construction arm of the government by the most effective, economical means—control and supervision of local, private contracting firms. The objective is to improve internal conditions for Cubans.

Public vs. private work

One large U. S. firm incorporated in Cuba and staffed mainly by Cubans is presently feeling the pinch. A Cuban engineer-executive of this firm hopes outside capital will come through; things are really slow for the firm as far as private work goes.

But public works—in the planning stages at least—presents another picture. In an exclusive interview, Ing. Bartolome Bestard Roca, Subsecretary of Public Works in charge of Construction, said that the plan of the new government was to take first things first and progress gradually.

The intention is: 1, find what is to be done; 2, find persons best able to carry out the work; 3, do the job.

Public Law 441 of the Revolutionary Government reorganized the Ministerio de Obras Publicas. Key positions were filled by men from private life in Cuba who had, over the years, demonstrated ability in their various specialties.

In practice, MOP will do no original planning. The Comision de Fomento Nacional (the commission for encouragement of national growth) will propose, study, and design projects. The MOP will convert the designs into contract drawings and specifications, then let the work out to the lowest qualified bidder among private construction firms.

Much work planned

For the current half year—July 1 through December 31—134 million Cuban pesos (on a par with U.S. dollars) has been appropriated for an ambitious program. Here are some of its objectives.

1. More than 1,000 km of new farm-to-market roads (caminos vecinales) will be built on the island to aid the agrarian reform.

2. A new, separate department has been created to handle preventive maintenance. This covers a wide variety of work. It includes drainage, for instance; no drainage has been provided for any previously constructed caminos vecinales, and superhighways have been built and left without maintenance of any kind. No more superhighways are planned until more fundamental needs have been met. Much new equipment has been purchased to convert old run-down byways into good, all-weather roads. These purchases have been made abroad.

3. A basic good road circuit to link Cuba's points of natural interest and scenic beauty is being built, and work is in progress on good first-class tourist accommodations at various locations. The average tourist in Cuba comes only to Varedero Beach or to Habana for gambling, the night spots, the races, and jai alai. The scenic-roads-ring phase of the new plan will open the whole island to the car-renting or bus-riding touring public.

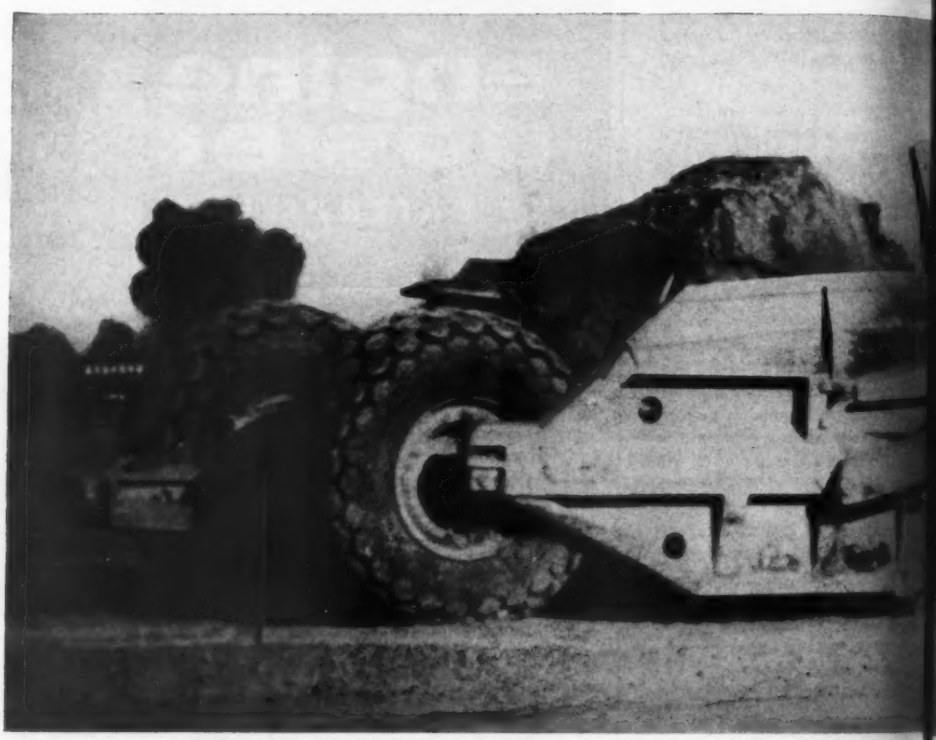
4. Water, sewer and electric light systems are under construction for all cities, large or small.

5. Rural schools, school centers, hospitals, recreation facilities, and child care camps are part of the basic present plan.

Long-range plan

The entire ministry is now moving into a new building at the still incompleted Centro Civico that surrounds the massive monument to José Marti between the city and Rancho Boyeros Airport. MOP had been using its old location at Sol and Cuba streets in Habana since about 1925.

The MOP long-range plan, for which no appropriations or schedules have been set, depends on a study to



Work at a standstill for private outside firms; ambitious public works program is being planned

by M. D. MORRIS, engineering consultant, New York, N. Y.

...e made by the Comision de Fomento ...acional and advice from the Na...nal Planning Board. The plan will ...over work on river and harbor devel...pment, flood and erosion control, hy...droelectric power plants, mines and ...natural resources, new agricultural ...areas, roads, schools, and recreation ...facilities. The projects will be started ...gradually as soon as the government ...solves the problem of financing them.

Aside from the problem of long-...range funds, the government faces ...many more questions. What is to be...come of the engineers and technicians of the former ministry? How will the old construction forces of the MOP be asborbed into private firms or other jobs? How will the economy react to the long-range plan?

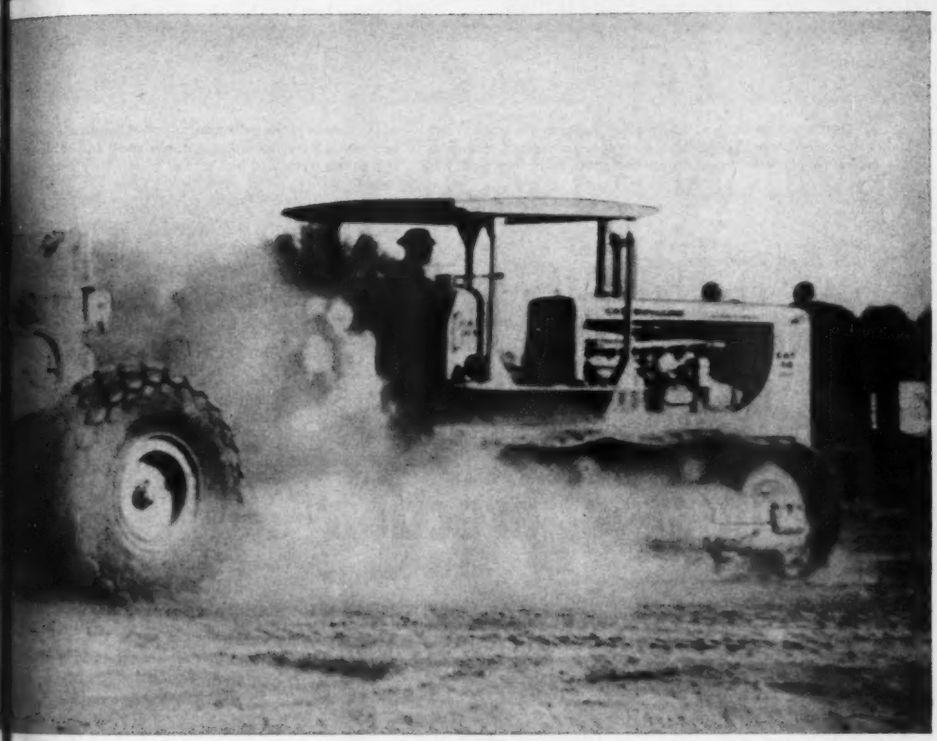
Little is certain

The ministry reorganization will have to be felt at all levels before work picks up. Nor is the situation being helped by the trepidation that Cuban and U. S. industry feels regarding plant expansion. This has hurt private construction very much, and MOP plans call for inspiring confidence in building ventures so that the lag in work can be overcome.

This is going to be difficult in view of the country's quicksilver political situation and the deteriorating relations between Cuba and the U. S. Even educated guesses are hard to make on the status of some industrial facilities. The Castro government was recently giving reconsideration to the nickel and cobalt concession granted the Moa Mining Co. by the Batista regime. This company has been spending $76 million on a concentration plant, workers' homes, and related facilities in Oriente Province. Moa acquired mining rights in accordance with Cuban law, which granted partial tax exemption for a limited period.

The National Bank of Cuba was also reported considering making a bid for the Nicaro nickel plant owned by the United States Government in Oriente Province. The plant, built during World War II, has been operated by private industry under a lease from the U. S.

There are plenty of uncertainties in Cuba regarding construction. But external firms are sure of this: if they are going to earn Cuban pesos for building, the pesos will have to come from outside investors who have faith in the island's future. THE END



Timken acquires assets of British Timken

■ The Timken Roller Bearing Co., Canton, Ohio, has acquired the assets of British Timken Ltd. Assets of the acquired company include Fisher Bearings Co. Ltd. and British Timken S. A. (Pty.) Ltd. Assets of British Timken subsidiaries in Canada, Germany, Australia, and France have been acquired by Timken subsidiaries in those countries.

Under the new organization, the plants will be termed British Timken, division of The Timken Roller Bearing Co. Management of operations of the division will remain in the hands of British personnel, with Sir John Pascoe as chairman of the newly created board of directors and S. F. Bennett as managing director. Other members of the new board are John Eden, W. R. Timken, and H. E. Markley.

Fageol buys assets of B-Z Machine Products

■ R. D. Fageol Co., Kent, Ohio, has purchased all the assets of B-Z Machine Products Co., also of Kent. The facilities of B-Z will be moved to the Fageol plant and will operate as the company's B-Z Machine Division.

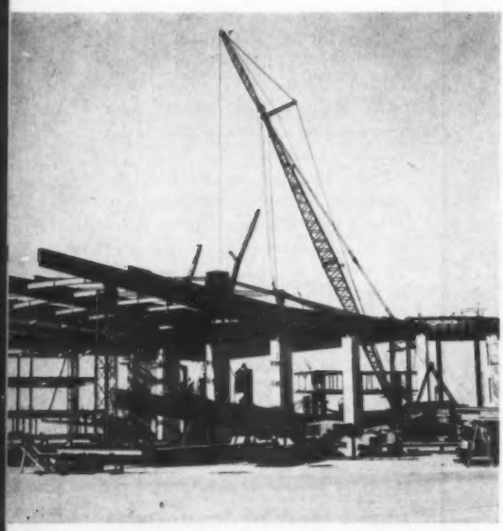
Waco purchases division

■ The Transwall Folding Partition Division of Bemis Bro. Bag Co., St. Louis, has been purchased by Waco Mfg. Co., Minneapolis. Under the new management, Transwall Division will continue to produce its lines of folding partitions for industrial and institutional use, and will operate through its present distributors.

Cunningham-Limp opens new southern office

■ Southeastern division offices have been opened at 3030 Peachtree Road N. W., Atlanta, Ga., by Cunningham-Limp Co., Detroit. Vice president James F. Benson will be in charge of the construction firm's new offices.

Thirty-two girders are being set to form the canopy of the Pan American World Airways passenger terminal at New York International Airport. Four jets will be able to nose under the canopy. The Manitowoc 3900 is positioning the special turntable used for cable stringing at the outboard end of the girder on the ground.



After the three sections are welded on skids, the girder is rotated until the web is vertical, a stiffening truss is attached to the top flange, and 6 Bethlehem 2½-inch cables are attached.

Canopy roof design demands new ideas in steel erection

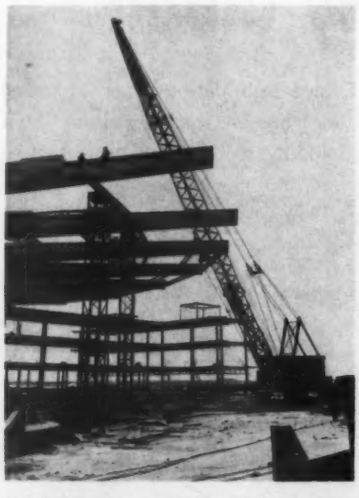
by TONY MAVROUDIS, field editor

(Additional photo on front cover)

Now that over 4,500 tons of steel has been erected for the new $10 million Pan American World Airways passenger terminal at New York International Airport, air travelers can appreciate the symmetry of this unique structure. Located just west of the International Arrivals Building, the central point of the airport's new Terminal City development program, the new terminal has an oval steel canopy, about four acres in area, to cover the building proper as well as loading and unloading areas for the planes.

The principal support for the canopy is provided by all-welded structural-steel girders, fabricated and erected by Lehigh Structural Steel Co., Allentown, Pa. Thirty-two girders frame into a central core area

Two Manitowoc 3900's with spreader beams set a girder over the rocker assembly on the concrete pier. Purlins loosely fastened between girders allow girder movement during stressing.



While two cranes support a girder, a Manitowoc 3000 moves a steel falsework tower under the outboard end. Three girders are erected before cables are stressed.

A crane elevates saddle and cables in the framework of a jack tower and then four 100-ton jacks in the corners of the tower stress the cables. After the load is transferred to the steel tower framework, the section of the 14-foot saddle column will be welded to the girder.

nd radiate to form an elliptical roof. The outboard ends of the girders describe an ellipse having a major axis of 828 feet and a minor axis of 422 feet. The edge of the reinforced-concrete roof deck will project 10 feet beyond the cantilevered girders.

This central core area, providing the inboard support for the canopy girders, is hexagon-shaped and consists of six structural-steel anchor columns and six steel girders. The canopy girders rest on 32 reinforced-concrete piers located 104 feet from the outboard end of the girders.

Requiring 2,060 tons of structural steel, the 32 girders were shop-assembled into three sections and shipped to the airport. The longest section was 100 feet; the shortest, 45 feet; the heaviest, 33 tons; and the lightest, 15 tons. The longest complete girder is 224 feet; the shortest, 166 feet; the heaviest, 76 tons; and the lightest, 61 tons.

Attached to each girder, prior to erection, are six 2½-inch-diameter galvanized wire cables. From the top flange of the canopy girder at each pier, a 14-foot cable post supports a cable saddle. The saddle provides for three tiers of two cables each. One end of each cable is anchored to the outboard end of the girder, and the other end is anchored to the inboard end. Over 31,000 linear feet of Bethlehem 2½-inch cable was required.

Each cable and its fittings has a minimum ultimate tensile strength of 740,000 pounds. The design load under full dead and live load for each group of six cables was 1,550,000 pounds. During erection, each group was pretensioned to 600,000 pounds.

Erection procedure

This, basically, was the procedure for erecting the canopy girders:

1. The three girder components were assembled in the field, on skids, with the girder web horizontal.

2. The two girder splices were field-welded without changing the position of the girder on the skids.

3. Four special "rolling beams" were used in the skids. By using a balance beam between each pair of rolling beams, two Manitowoc 3900 cranes rotated the girder so that the web was brought into a vertical position.

4. A special stiffening truss was attached to the top flange of the girder to provide lateral stiffness during the pretensioning of the cables and girders.

5. The six 2½-inch cables were then attached, using a specially built turntable located at the outboard end of the girder. Without the cables being stressed, both ends of each cable were anchored to the girder and the cables passed through the cable saddle.

6. The two Manitowoc cranes, using balance beams, then set the canopy girder into position. Of course, the center-core steel and the piers were previously completed and readied for the girder. A temporary erection tower was required during the work to sup-

(*Continued on next page*)

Girders are rolled into vertical position by these turning beams that serve as shoring for the upright member. The turning beams revolve around an axis in line with the bottom flange of the girder at its deepest point. Note the rounded corner of the beams, which are rotated by two cranes. Brackets that support planking for steelworkers are passed through openings of the concrete-slab tie that has been welded to the web of the girder.

Lincoln 400-amp welding machines, powered by a Cummins generator set, left, supply power to welders making field connections. Just behind the welding machines, a girder is being made ready for erection.

(*Continued from preceding page*)

port the cantilevered outboard end of the girder.

7. The wide-flange steel purlins were then erected.

8. After the two adjacent bays of purlins for a particular girder were erected, a special jacking tower was attached to the girder. The cable saddle was then raised to the proper elevation and the 14-foot cable post positioned. The cables were then stressed by the four 100-ton jacks in the jacking tower.

9. Two temporary braces were attached to the girder between the pier and the inboard anchorage. These braces remain in place until the roof slab is placed and cured.

10. At this point, the special stiffening truss used in Step 4 and the erection tower used in Step 6 were removed.

Field welding

Lehigh used a Cummins 125-kw generator set providing current for twelve 400-amp Lincoln motor-driven welding machines. Each of the three girder sections was temporarily connected to an adjacent piece by means of fitting angles on the underside of the web. Timber mats and skid beams were used to support the sections at the ends, adjacent to the splices, and in between as required, to maintain the webs in the same plane. The shape of the horizontal assembled girder was constantly checked by means of a base line established by punch marks furnished on each web section.

The welding of the two girder splices started with the web groove. The root pass was made with 3/16-inch-diameter electrodes and followed up with 7/32-inch-diameter electrodes. Root passes for the flange welds were made with 5/32-inch-diameter electrodes and followed by passes with 3/16-inch electrodes.

After welding, the girder was rotated into a vertical position. The four turning beams, previously placed under the horizontal girder sections, and supporting the top and bottom flanges, were used for this. These beams were rounded at the point of rotation so that the two Manitowoc cranes, each lifting at the outer end of two turning beams, could gradually rotate the girder about an axis in line with the bottom flange of the girder at the deepest point. These turning beams, in an upright position, also formed the shoring system to hold the girder in a vertical position. A horizontal stiffening truss was then placed and secured to the top flange of the girder. This was done to prevent any lateral buckling of the girder during the prestressing of cables.

Once the horizontal stiffening truss was placed, Lehigh positioned the upper section of the cable post and the cable saddle at the center of the girder. Lehigh made prior arrangements with Bethlehem Steel to have the cables shipped in single coils of exact lengths, with the anchor sockets already installed. This permitted the use of a turntable placed near the outboard end of the girder, and eased the stringing of the cables by one of the cranes.

The six cables were placed in the saddle and connected to the girder, starting at the pin ends of the lowest pair of cables. Cables were marked with saddle centering marks and longitudinal striping along their lengths, to assure straightness. Temporary clamps were used at the saddle

to prevent movement of individual cables.

Cables stressed

The girder, with the 2½-inch cables in place, was then erected by two Manitowoc 60-ton cranes that used two spreader beams to lift at four locations on the girder. Each girder had to be moved laterally from its assembly area to the piers, and for this reason each girder was assembled as close to its pier as possible. A central assembly area was not feasible, since this would have involved travel over the concrete apron outside the building.

The girder was raised and placed on the rocker assembly at the pier; connected to the central hexagonal anchorage at the inboard end; and temporarily supported at its outboard end by means of a falsework tower. After three adjacent girders were erected in this manner, and all the purlin framing was loosely bolted into place, the prestressing of the cables on the center girder commenced. It was started by first elevating the saddle and cables in the framework of a jacking tower. This was handled by one of the cranes.

The final stage of lifting was done by four Elgood 100-ton hydraulic jacks, one in each corner of the jacking tower. The load in the final position was transferred by bolts and pins directly into the steel tower framework. The lower section of the 14-foot saddle column was then positioned and its base welded to the top flange of the girder; the upper saddle section was lowered and bolted to the lower section. As soon as the rocker-column connections were completed, the tower was removed.

Jacks were also placed on the falsework towers to elevate the adjacent girders and to minimize the differential movement of the girders while the cables of the center girder were stressed.

After the cables on the girders were prestressed and the cable post put in place, the stiffening truss was removed. The stiffening trusses on the other two girders were kept in place until a fourth girder was erected in sequence and all bracing was in place.

The canopy design is a striking departure in air-terminal design. Four giant jet air liners will be able to nose under its protective cover, bringing passengers practically to the doors of a terminal for the first time. Scheduled to be completed early in 1960, the terminal is designed to handle a fully loaded 160-passenger air liner every fifteen minutes.

Terminal features

The usual terminal entrance will be eliminated, and in its place will be a 100-foot-wide air curtain. This curtain will maintain a pressurized flow of air to counteract the infiltration of outside air, while allowing free passage of people through the entrance.

Planes will be boarded from the second floor by an elevated passageway; passengers will not have to climb stairs or walk through grease and water puddles to aircraft boarding ramps. This will also facilitate baggage loading and unloading, which can continue unimpeded on the ground.

Baggage check-in will be at the entrance of the building, where many scales and counters will eliminate the need for passengers to wait in line.

Frank Sevier was the superintendent and Leo McGuire the chief engineer for Lehigh on the job. G. W. Metz is manager of construction for Lehigh. Tippetts-Abbett-McCarthy-Stratton, New York, N. Y., is the architect and engineer, with Ives, Torano & Gardner, New York City, as associate architect. Turner Construction Co., New York City, is the general contractor for Pan American.

THE END

"The men took a vote, Charley, and guess who was chosen to play Santa Claus this year?"

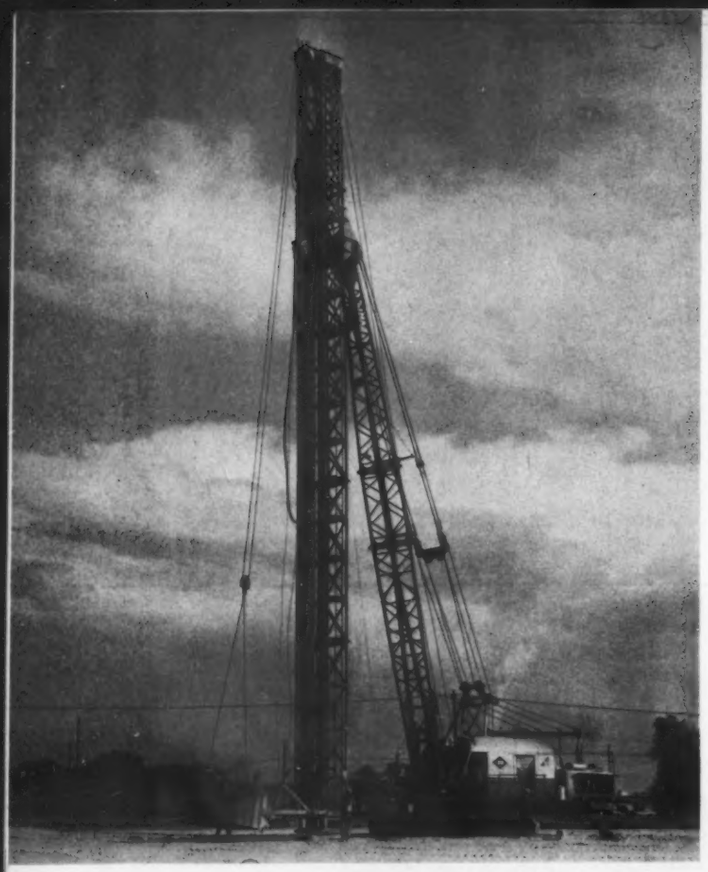
Sand drains stabilize base for highway fills

Belt loader and dozers speed handling of 1.1 million cubic yards of borrow material for urban freeway

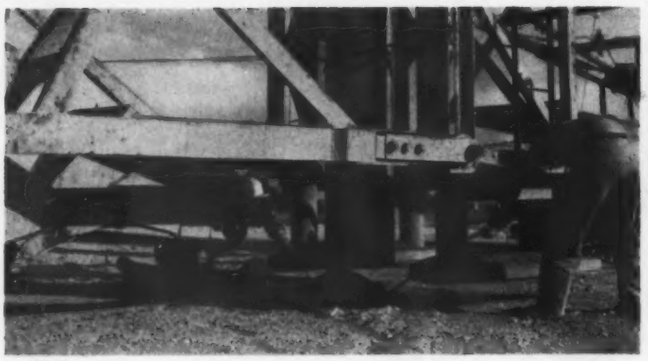
Sand drains driven through a soft, wet subsurface stratum stabilized the base for the roadway embankment on a 5-mile section of new freeway being built through Salt Lake City. The road, a section of Interstate Highway 15, runs north and south through Utah's capital city, passing a short distance to the west of the downtown area.

The first of several contracts in the project was awarded by the Utah State Road Commission to Gibbons & Reed Co., Salt Lake City. It consists of the grading and drainage of a 24-mile section at a cost of $1.64 million. In addition to placing some 5,000 of the sand drains, the contractor developed a high-production borrow operation to produce the 1.1 million cubic yards of embankment.

This project is the first known use

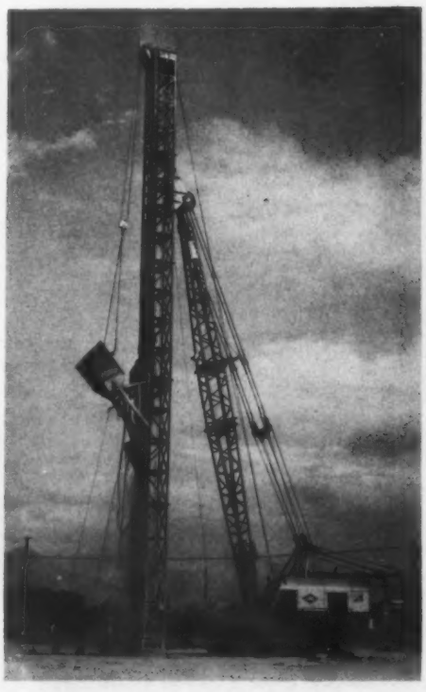


New to the Salt Lake City area—and new to the contractor—is bridge approach-fill stabilization by sand drains. The drains, used for fills up to 40 feet high, are being driven by a Lima 1201 crane that uses 100-foot leads to support a McKiernan-Terry C-8 hammer and a specially equipped 16-inch-diameter casing. The hopper suspended from the leads carries sand to the hopper at top of casing.



The 16-inch drive casing is being positioned; the hinged cover is hanging free and touching the ground. Legs of the leads are equipped with foot pads to provide extra support when the casing is being pulled. Drains are placed in rows 5 to 14 feet apart in a gridiron pattern.

As the casing is being driven, a Michigan 75A tractor shovel fills the transfer hopper with a specially graded sand. Then, when the casing is partially driven, the hopper is raised and the sand dumped into the hopper at the top of the casing. Sand is forced into the casing after a firm stratum is reached.



The hopper that is just above the casing has air-operated gates that open to admit sand, then close so that air pressure can be applied to drive sand out as the casing is pulled. A workman on the ground trips the gate to dump the sand into the casing. The McKiernan-Terry hammer is operated by air supplied from the two Ingersoll-Rand 600-cfm Gyro-Flo compressors on the rear of the crane.

In 30 seconds or less, a Kolman 5-foot loader, rated at 1 cubic yard per second, fills a Cook Bros. 18-yard bottom-dump trailer with borrow for the roadway embankment. An International truck pulls the trailer. Tractor-dozers in the pit feed the loader; oversize goes to the truck at right.

of sand drains to stabilize a subgrade in this area. The method was recommended by Porter, Urquhart, McCreary & O'Brien, which was retained by the state road commission as consulting engineer on the planning and construction of the project.

The job was also the contractor's first experience in the installation of sand drains.

Subgrade soft and wet

The new freeway alignment lies in the old Jordan River basin, where a crust of earth from 15 to 20 feet thick overlies a soft compressible stratum. This underlying material contains 20 to 60 per cent of water. It ranges as much as 60 to 70 feet in depth. Beneath it are relatively stable beds of sand and clay. Intermittent sand lenses in the soft stratum made the driving operation difficult.

While the surface crust supports most of the existing highways, as well as homes and other small structures, it would not support the bridge approach fills of the freeway. These fills range up to 40 feet high and include a major part of the embankment placed under this contract.

Several big problems confronted the designers and the contractor. First, the subsurface layer had to be relieved of the water. The sand drains provide the means for this drainage. Secondly, the soft underlying material had to be compressed to give it greater stability and bearing strength. This required the placing of a surcharge. Finally, the adjacent property had to be protected against subsidence. This was accomplished by digging a shear trench along both sides of the right-of-way in critical areas and by the use of sheet-pile cutoff walls adjacent to buildings.

Placing the sand drains

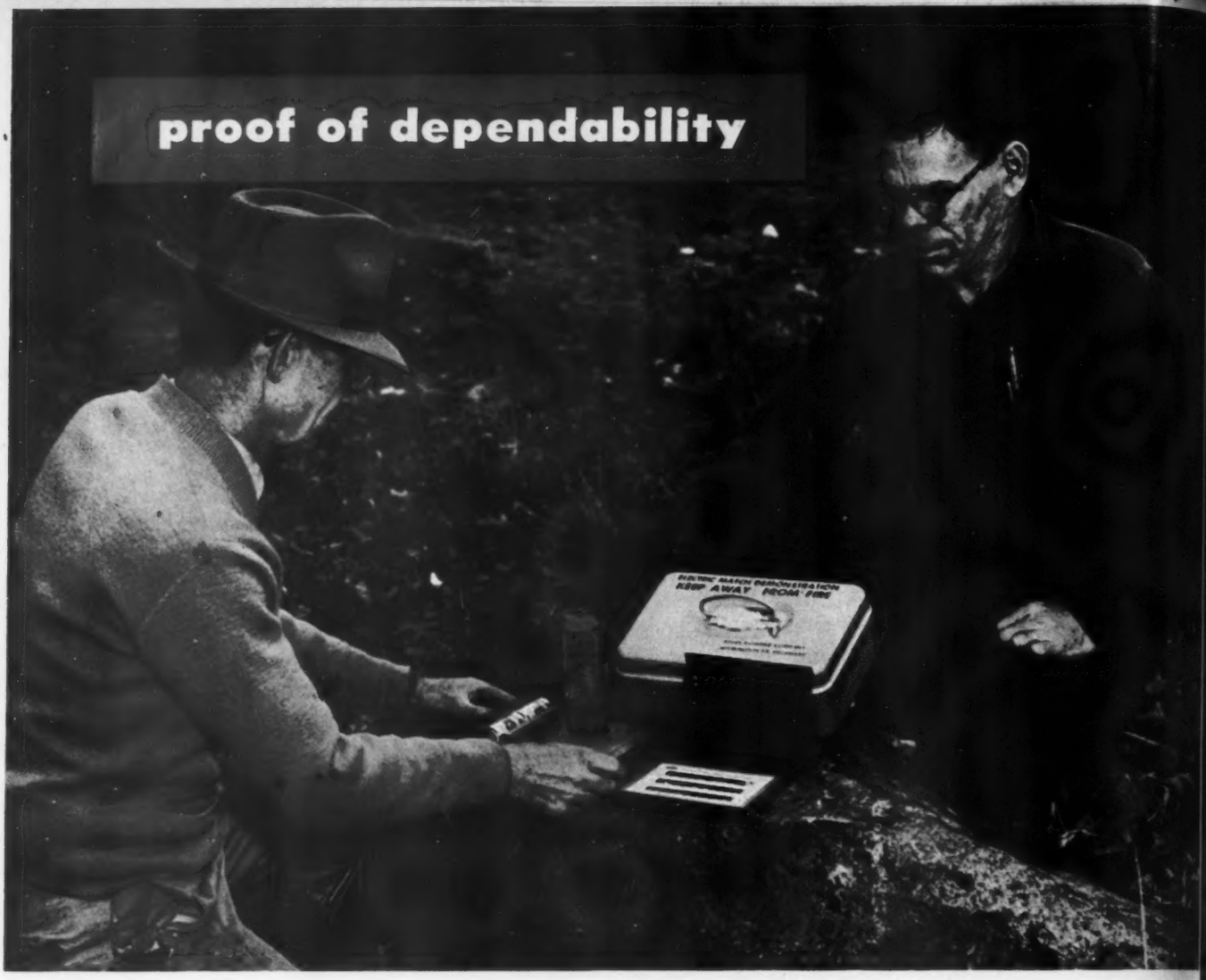
The 280,000 linear feet of sand drains was placed from a specially built steel casing that was driven and extracted by a highly mobile pile-driving rig. The entire unit was mounted on a Lima 1201 crane. The 100-foot-long driving leads were hinged to the end of the crane boom and guided by adjustable arms attached to the front of the crane. Operating in the leads was a McKiernan-Terry C-8 double-acting hammer. It was powered by air supplied by two Ingersoll-Rand 600-cfm Gyro-Flo compressors mounted behind the counterweight of the crane.

A heavy hinged cap closed the bottom of the 16-inch steel casing to keep out dirt during the driving. At the top of the casing was a hopper fitted with air-operated gates. These gates could be opened to admit sand into the casing and closed so that air pressure could be applied to force the sand out.

While the casing was being driven, a Michigan 75A tractor shovel filled a hopper on the rig with a specially graded sand. When the casing was partially driven, the hopper was raised up the leads to dump the sand into

(*Continued on page 17*)

Adjacent property was protected against subsidence by the installation of a sheet-pile cutoff wall anchored back to deadmen. The Ford tractor is using a Sherman hydraulic hoe to excavate for a deadman; workmen in the background are placing the tie rod that will join the wall wale and the deadmen.



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(*Continued from page 15*)

receiving hopper at the top of casing. When the casing had been through the soft material to a stratum below, air pressure was produced into the top of the casing crane slowly pulled it back out ground. This left the 16-inch- meter hole filled with compacted porous sand.

Drain trenches remove water

sand drains were placed in spaced from 5 to 14 feet apart gridiron pattern. The spacing de- ded on the nature of the under- material and depth of fill.

ch row of sand drains had a haped ditch extending completely the right-of-way and backfilled sand. Gibbons & Reed developed genious rig to dig and backfill trench in a single operation.

rig is essentially a large plow rying a hopper that fed sand into trench. Two tractors, a Cat D8 an Eimco 105, teamed up to pull plow. Two Michigan tractor ders fed the sand from stockpiles the hopper as the rig moved ng.

ese trenches collect the water ich rises through the sand drains lead it to surface drains at the es of the right-of-way. This per- ted water to escape from the sub- e as pressure was applied by the ght of the embankment.

purpose of the operations was dry and compact the subgrade ma- ial to increase its stability and ring strength. This necessarily re- ted in a subsidence of the entire dway area. To protect adjacent perty from a similar subsidence t would cause damage was one of e big problems.

Wall protects buildings

In one area, where a large motel ilding adjoined the right-of-way, a 0-foot-long wall of steel-sheet pil- g was driven along the right-of-way e. A McKiernan-Terry 9-B-3 ham- er handled by a truck crane drove e MZ-27 and MP-115 sheets as deep 60 feet for the protective walls. el rods tied the wall wales back to le deadmen buried in the embank- ents.

In other areas, where there was nger of damage from subsidence t where buildings were not as close the right-of-way, a 10-foot-deep ear trench was dug along the right- f-way line to provide a plane of akness. This prevents the settle- ent within the right-of-way from awing down the adjacent property.

Belt loader on borrow

A substantial part of the 1.1 million ubic yards of borrow required to ild up the embankments came from its located some 3 to 4 miles from e project. The average haul was ose to 4 miles. In the largest of ese pits, three new Cat D8 tractor- ers and a big Kolman belt loader d the material to a fleet of Cook os. bottom-dump trailers pulled by ternational trucks.

The hillside location of the pit al- lowed the loader to be installed at a low elevation while the dozers began working high above. The three new turbocharger-equipped D8's kept a steady flow of material moving to the Kolman 5-foot conveyor, which has a rated capacity of 1 cubic yard per

(*Continued on page 19*)

The V-shaped ditches that extend across the right-of-way to link a line of sand drains are dug and backfilled with sand in a single operation by this contractor-developed rig. Basically, the unit consists of a large plow and hopper. An Eimco tractor pulls the rig, while a Michigan tractor-loader dumps sand to the hopper.

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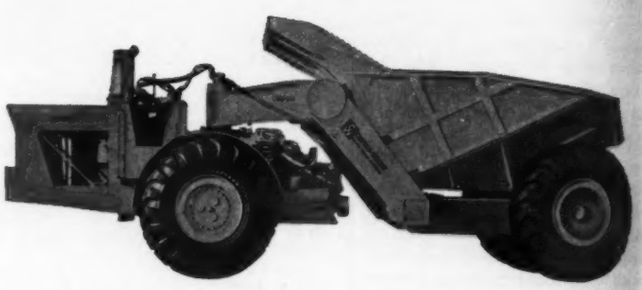

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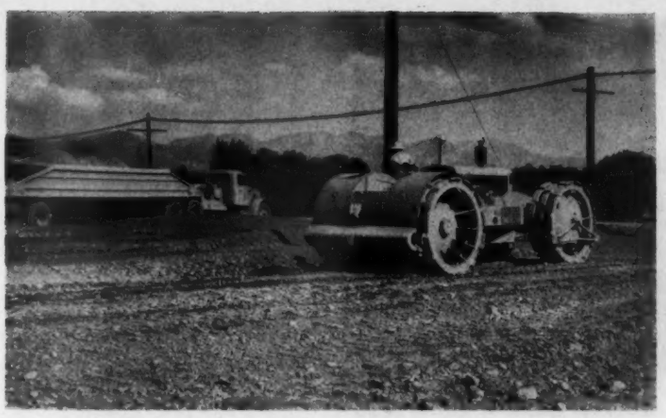
An Eimco Model 105 tractor-dozer works over the surface of a lift of surcharge embankment. Surcharge was required to compress the soft underlying material to give it greater bearing strength.



On the fill, a Cook Bros. truck-trailer unloads while a Buffalo-Springfield Kompactor works over the lift. The poles will be relocated before the grading project is completed.

(Continued from page 17)

mond. Actually, the loader was filling the 18-yard trailers on an average of about 30 seconds each. It seemed that the trucks hardly came to a full stop.

A 5-foot vibrating bar grizzly with 4-inch openings screened out the oversize as the material came off the belt. The oversize was carried over into another truck and hauled away.

The fleet of trucks dumped the fill on the roadway, where it was spread in lifts of 12 to 18 inches by tractor-dozers. Compaction was accomplished by the use of a Buffalo-Springfield Kompactor and by the other equipment operating over the embankments being built.

Approximately 110,000 cubic yards of the borrow was obtained from the excavation for the construction of a new state office building. This source was actually closer to the project than the regular borrow pit.

As the embankments were built up, the compression of the subgrade and the functioning of the sand drains became more obvious. Water squeezed from the wet subgrade flowed upward through the sand drains to the V-ditches at the surface and then to the drains at the edges of the fills.

Piezometers and settlement gages installed at strategic locations provided factual data to support the visual observations.

This first contract of the project was awarded in January of this year and provides 350 working days. Completion is scheduled during the summer of 1960. Other contracts will be under way before that time.

Personnel

Over-all supervision of the project for Gibbons & Reed is in the hands of project manager R. C. "Ron" Jones. Assisting him are superintendent Lee Bryer and assistant superintendent Grant Collett.

Edward Kennelly is serving as resident engineer for the Utah State Road Commission on the work. J. C. Young supervised the design for the consulting engineers, and L. J. Stephenson served as project engineer for the consultant during construction. John B. Skewes is chief construction engineer for the Utah department, and Elmo R. Morgan is director of highways. THE END

For more facts on Curtis-Wright, circle No. 261

Prestressing at work

U. S. Senator Albert D. Gore of Tennessee strikes keynote at opening of the Prestressed Concrete Institute convention at Miami Beach.

The Prestressed Concrete Institute, during its annual four-day meeting, emphasized prestressing at work through new design concepts, research, and development.

The Institute's fifth annual convention was held at the Deauville Hotel, Miami Beach, Florida, November 2 through 5. The 526 men registered included representatives from prestressed-concrete producers, suppliers of materials and equipment to the industry, engineers, architects, concrete technicians, college professors, and highway officials.

At the opening session, Sen. Albert D. Gore (D., Tenn.) in the keynote address called the PCI a progressive outfit in a relatively new industry. He cited its members for pressing on with a new economic concept in heavy construction, and for challenging the physical facts and notions of the status quo. Declaring that this challenge in competition is related to the preservation of the free enterprise system, Sen. Gore deplored the fact that there is so little competition in the major elements of American industry. He scored the steel industry for what he termed its administered prices, and the virtual lack of competition among the steel producers.

In Pennsylvania, according to Sen. Gore, the heart of the steel industry, "if the steel industry has a heart," 90 per cent of bridges under construction with spans 100 feet or less are being built of prestressed concrete, although they were originally designed to be constructed of steel. "Competition is necessary for progress," said Sen. Gore, calling attention to the development of both prestressed concrete and aluminum in competing successfully with steel.

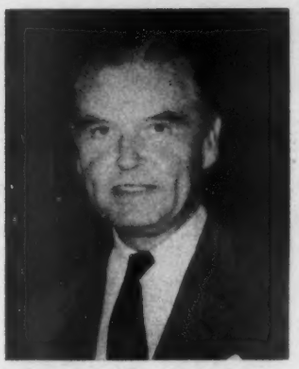
The Tennessee senator called on the American people to develop a progressive concept of growth as contrasted to an ultra-conservative, let-well-enough-alone policy. He declared that the latter policy was attempting to prevail in the federal highway program where Maj. Gen. John S. Bragdon of the White House staff was urging a virtual abandonment of federal highway improvements in municipal areas. Sen. Gore said that the federal budget is not to be compared to a family budget tied to the breadwinner in the family, but to a government that is a continuing process and linked to a dynamic, growing, free enterprise system based on confidence in the future.

Around the world

One of the "prestress at work" sessions was devoted to reports of prestressed-concrete progress in various parts of the world. James D. Piper, vice president, Portland Cement Association, traced the history of the prestressed-concrete industry in this country from its first use in tank construction in 1936. Piper pointed out that the theory of prestressing had been developed in the last century, but it was not until after World War II that real progress was made. Citing the shortages of building materials, particularly metals, in Europe as a factor in causing Europeans to turn to prestressed concrete, Piper stated also that cheaper labor costs and closer architect-engineer-contractor relations favored the development of prestressing in Europe into workable and practical design and construction.

The PCA executive reviewed the slow initial acceptance of prestressing in the U. S. and the problems of reducing labor costs and the development of production line techniques. According to Piper, the construction of the Walnut Lane Bridge in Philadelphia in 1949 jolted the materials market out of its complacency and started prestressing on a rapid progressive growth. He termed the most popular prestressed bridges in this country to be of pretensioned box beams, pretensioned I-beams, and post-tensioned long-span girders. Elements for the first two types are

eme of PCI convention



New PCI president Randall M. Dubois of Freyssinet Co., New York City. He will serve until September, 1960.

PCI's new executive secretary, Norman L. Scott. The institute moves its headquarters to Chicago January 1.

usually produced in plants, while the post-tensioned girders, with spans in excess of 100 feet, are custom-built at the site.

At first, noted Piper, U. S. engineers leaned heavily on foreign techniques and tended to be over-conservative in design as is usual in all pioneering efforts. Now, he related, U. S. construction is markedly different from that in Europe. The seven-wire strand is employed here in pretensioning work instead of the smaller-diameter wire that is commonly used in Europe.

Long-line pretensioning has made mass production of prestressed members a reality. The design of building components is under constant development. The size of double tees is increasing. The use of high-strength concrete—5,000 to 6,000 psi—has also aided the development of prestressing in the United States.

Piper observed, too, that the ratio of strength to weight in prestressed concrete is now about half that of steel and in the foreseeable future could be equal to that of steel. He called attention to the growing and varied uses of prestressed concrete in such things as decorative precast wall panels, house construction, and railroad ties. The PCA spokesman remarked that both the Seaboard and Atlantic Coast Line railroads will soon install sections of track supported on prestressed-concrete ties or sleepers. While conceding that the concrete ties cost more than the wooden ones they will replace, Piper pointed out that two concrete ties will serve where three wooden ties are needed. Looking into the future, Piper predicted that prestressed-concrete pavements could be the next area for development, particularly for runways and taxiways at airports to meet the demands of the jet age for heavily-loaded planes.

Challenge to producer and developer

William E. Dean, Jr., assistant state highway engineer, Florida State Road Department, said that the shortage of engineers trained in prestressed-concrete design was being overcome by numerous short courses and the inclusion of prestressed design in the structural curricula of most engineering colleges. He also pointed out that the development of American Association of State Highway Officials-PCI standard bridge beams has introduced simplicity and uniformity in the design of short-span highway bridges and has shortened design time. Dean mentioned the use of longer span bridges such as the Oneida Lake, N. Y., structure with a 320-foot span. He also called attention to the multistory building market with two, three, and four-story buildings, and even a 21-story structure now under construction in Seattle, Wash.

The Florida highway engineer warned the PCI delegates, however, of current challenges and future problems. He urged producers to recognize the fact that some commercially produced members often leave much to be desired and observed that there are already cases of plants going out of business due to this complaint.

"It is usually poor workmanship," said Dean, "that is the cause for complaint, not engineering." He declared that the difference between good and bad workmanship is simply one of management attitude, not dollars and

(Continued on page 24)

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LOADS 10,000 TONS PER DAY

Holly Mfg. & Mining Co. produces 16 classifications of material — ranging from fine asphalt sands to 2½" stone — from its pits in the Holly, Michigan area. It is presently supplying aggregate for Denton Construction Co.'s paving contract on State highway M-78 relocation.

To make sure that its gravel is well within the State Highway Department specifications Holly uses heavy-media separation as well as conventional washing methods. And to be sure that it has flexibility, capacity and reliability on its truck-loading operation it has two "PAYLOADER" tractor-shovels. These two machines — a Model H-90 with 3-yd. bucket and a Model H-70 with 2-yd. bucket — load as many as 250 trucks (40-ton tandems) on a busy day, and regularly average about 100 trucks a day — plus stock piling and clean-up work.

W. D. Hancock, Manager of Holly Mfg. & Mining Co. says, "We are well satisfied with these two machines" and the "PAYLOADER" operators are especially impressed by their "ample power, ease of operation, maneuverability and loading speed."

Pit and plant operators and contractors have been profiting with 4-wheel-drive "PAYLOADER" work-ability for more than eleven years. Most of those pioneer machines are still at work. And today's 4-wheel-drive "PAYLOADER" units are also far ahead of the field — in performance, ease of operation and usefulness — and are available in a complete range of sizes from 5,000 to 12,000-pound carry capacity.

Backing up "PAYLOADER" performance is the finest Distributor organization in the rubber-tire tractor-shovel industry — with complete facilities. Contact your Hough Distributor today and find out what a modern "PAYLOADER" can do for you.

HOUGH®

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.
762 Sunnyside Ave., Libertyville, Ill.

Send data on all "PAYLOADER" models and attachments

Name.....

Title.....

Company.....

Street.....

City.....State.....

11-B-4

For more facts, use coupon or Request Card at page 18 and circle No. 267

At the Kurt Orban Co. booth, dainty geisha Chiko Medlin offers cup of tea to Howard F. Morris, Concrete Materials, Inc., Charlotte, N. C.

Dr. Emil Schmid (profile) discusses product uses with visitor to Sika Chemical's booth. The company was one of 33 exhibitors at the convention display.

A busy place was Plant City Steel Corp. exhibit where Watco forms were displayed. The equipment show was a practical adjunct to the convention.

(*Continued from page 21*)

cents, and urged that steps be taken immediately to insure a uniform high-quality product throughout the country. Dean stated that the proposal for PCI certification of plants was a step in this direction.

In his paper, Dean called attention to the fact that steel industry research is working on ideas for new rolled sections that will be more competitive with prestressed concrete. Attention was also called to the fact that the aluminum industry is aggressively entering the field of bridge and building parts, and specialized structural applications, and that reinforced concrete is proving more and more competitive. As an example in the latter field, Dean cited the hyperbolic-paraboloid roof competing against double-tee construction.

Dean observed that this meant the producer must use every device in the industrial engineer's handbook, plus his own ingenuity, to cut production costs and raise the quality of his product. And engineers need to devise some simple, inexpensive means to achieve continuity and joints and connections that will permit frame action.

"Continuity in bridges means a reduction in first costs and in maintenance costs by a better distribution of moments and the elimination of troublesome joints and extra bearings. Continuity and moment connections are the keys to the multistory building market", Dean said.

Prestressed pavements

J. P. McIntyre, directorate of civil engineering, U. S. Air Force headquarters, discussed the first application of prestressed-concrete pavement for a taxiway at Biggs Air Force Base, Texas (See "Post Tensioning for Taxiway Pavement," CONTRACTORS AND ENGINEERS, November, 1959, pg. 27). The advantages of such a pavement, according to McIntyre, are: stronger pavement; elimination of cracks; reduction in number of joints; reduction of damage to joint materials; less

Blonde Cliffy Priest demonstrates automatic device to conventioneer at International Prestressing's booth. The display was open three days of the meeting.

Mr. and Mrs. James S. Simms explain Simms Engineering products to interested delegate. Many sales of equipment were made at the show.

Looking over a section of their exhibit are Laclede Steel executives Warren Loveridge, Mack H. Glazier, Jr., and A. Carl Weber. Firm's headquarters are in St. Louis.

maintenance; reduction in quantity of material; and reduction in grading because of thinner slabs. McIntyre acknowledged, however, that greater experience and know-how are needed in this field so as to develop mass production methods; also that more promotion of prestressed paving is essential to make this type competitive.

According to the Air Force engineer, the cost per square yard of a 9-inch prestressed pavement is about twice that of a 24-inch non-reinforced concrete pavement that is equivalent in design strength to the prestressed slab. McIntyre pointed out, however, that the prestressed pavement at Biggs AFB was both experimental and a first-of-its-kind job for the contractor. These factors made this initial work more expensive than would repeat jobs of a similar nature. Also, some fringe benefits go with the prestress design; there is less wear on the tires of high-speed jet planes because of the elimination of most of the transverse paving joints. The Air Force spokesman urged the industry to work for improvements both in the design and methods of construction of prestressed-concrete pavements.

Committee reports

One of the convention sessions was given over to technical committee reports that included such subjects as durability, plant standards, load distribution, grouting, fire rating, and joint activities of AASHO-PCI committees. Two panel discussions with architects and PCI members covered mutual problems of the two groups. Still another session discussed current and recent research activities in prestressed concrete. At the final session, reports on prestressing in the 49th and 50th states were presented. David M. Goodall of the U. S. Bureau of Public Roads discussed the work in Alaska. Hawaii projects were described by Alfred A. Yee, executive vice president, Park & Yee, Ltd., and by Charles W. Watson, assistant vice president, Hawaiian Dredging & Construction Co. Both are located in Honolulu.

New officers

PCI officers elected at the convention are: president, Randall M. Du-

(*Continued on next page*)

Vehicles at the AASHO Road Test chalked up 5 million miles of operation on the first anniversary of the start of full-scale test traffic. An average of 325,000 axle-load applications were made on each of the hundreds of test pavement sections. Test traffic will continue until the summer of 1960.

(Continued from preceding page)

bois, Preyssinet Co., New York, N. Y.; vice president, Jacob O. Whitlock, Midwest Prestressed Concrete Co., Springfield, Ill.; secretary-treasurer, Charles L. Scott, Jr., Southern Prestressed Concrete Co., Pensacola, Fla. Six new directors include: Ezra C. Knowlton, Salt Lake City, Utah; Robert J. Lyman, El Paso, Tex.; Robert A. Matthews, Kalamazoo, Mich.; Ross H. Bryan, Nashville, Tenn.; Elmer Clark, Phoenix, Ariz., and Charles B. Kiesel, Jr., New York, N. Y. The retiring president was Peter J. Verna, Jr., Concrete Materials, Inc., Charlotte, N. C.

The sixth annual PCI convention will be held at the Statler-Hilton hotel, New York City, September 26 through 29, 1960. On January 1, 1960, PCI headquarters will be moved from its present location in Boca Raton, Florida, to Chicago, Illinois, in order to provide a more central location for its membership. Norman L. Scott, assistant executive secretary, will then become executive secretary succeeding Col. Martin P. Korn, who is retiring. The Institute now has 670 members representing 30 different countries. Of this number, 125 are active producers whose plants turn out an estimated 80 per cent of the prestressed-concrete elements produced in the U. S. There are some 180 producers in the country.

A three-day post-convention trip to Havana, Cuba, was cancelled because of the strained relationship between this country and Cuba, and the current political unrest in the latter country.

A convention session scheduled for Tuesday evening, November 3 and titled "Soviet Night" also had to be cancelled. This session was to feature two Russian speakers, members of the USSR Academy of Construction and Architecture at Moscow, and films showing precasting and prestressing in the Soviet Union. The cancellation occurred when the Russians were unable to complete arrangement for their visit to the convention.

A display of prestressed-concrete equipment, supplies, and services was held in conjunction with the PCI meeting. Thirty-three exhibitors had booths in which they presented their products and developments. They came from all parts of the country from New York to California, from Wisconsin to Texas. THE END

Inspection procedures for welded highway bridges

■ Highway Research Board Special Report 45, "Welded Highway Bridges, Analysis of Inspection Factors," contains a glossary of welding terms and symbols; a summary of the welding inspector's duties and steps to be followed in inspection; a verification of procedures and welder qualifications, and the administering of any necessary qualification tests.

It also covers an interpretation of drawings and specifications; objectives of welding procedures and the basis for determining them; methods and devices for fitting, shop assembly and field erection; welding sequence; control and correction of distortion; defects in arc welds in mild and low-alloy steels; and safety equipment.

Priced at $1.60, the report is available from the HRB, 2101 Constitution Ave., Washington 25, D. C.

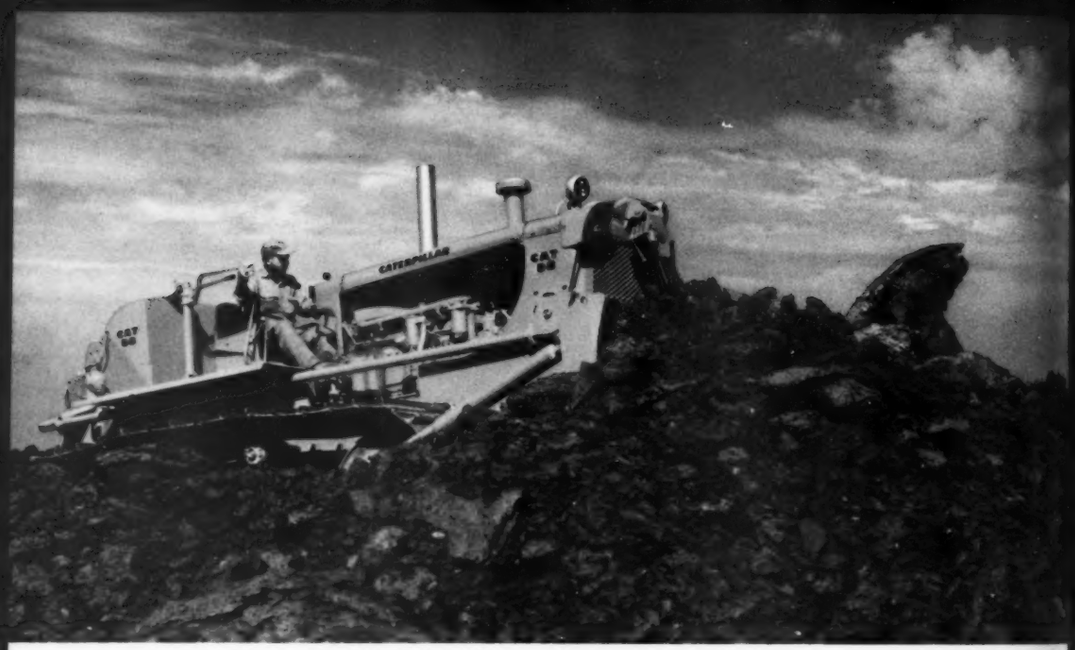
CATERPILLAR'S
PROGRESS REPORT
1959

NEVER before, in *one* year, has *one* manufacturer introduced a more impressive array of new heavy-duty earthmoving machines and major earthmoving developments than Caterpillar in 1959. All these new machines and developments, the dramatic result of Caterpillar's broad research and development program, have *one* common denominator: they pay off with faster, lower cost production than the earthmoving field has ever seen. They help you compete successfully in the most competitive construction market in history.

On the following pages you'll see all these machines and some of the developments. For the complete picture, see your Caterpillar dealer. Whatever your need, you'll find he has the *most productive* machine for it in his complete, modern, heavy-duty equipment line-up.

What about 1960? Caterpillar's multimillion-dollar research and development effort is a *continuing* program. That means you can count on *continuing* major equipment news from Caterpillar during the coming year. Keep your eye on Caterpillar in 1960!

Here they are— CATERPILLAR'S NE



D9 Series E

Now the "King of the Crawlers" is better than ever with new capacity for higher, faster, lower-cost production on any big-tractor job. Here are some reasons why:

NEW UNDERCARRIAGE. Here's the "newest look" in this take-charge giant. Its undercarriage is more massive, more rugged than ever. And major improvements in all track components add hundreds of hours of life to running gear—hours that mean more time even on the toughest job.

STRONGER TRACK COMPONENTS. Bigger, heavier track links, shoes, pins and bushings give longer trouble-free service in roughest going. Increased link pitch from 9" to 10¼" means added size and strength in all track components. New deep hardening steel gives up to 40% longer life to shoes, links and rollers.

NEW 335 HP (flywheel)—268 HP (drawbar). More powerful than ever, the D9's Turbocharged Engine has the capacity to handle bigger loads faster, with even greater dependability and economy. A new, compact Turbocharger packs more air by weight into the engine and improves fuel-burning efficiency.

NEW EQUALIZER BAR. This important improvement in the D9 helps increase production, particularly on sidehill applications where the rocking action of the bar shifts more weight to the uphill track. Result: better tractor stability and increased operator confidence.

D8 Series H

Pacesetter in its tractor class, the new D8 Series H incorporates dramatic new engineering advances. Some are described here. For complete details, see your Caterpillar Dealer.

NEW POWER. The horsepower of the new D8 is up from 191 to 235 at the flywheel, from 155 to 185 at the drawbar. In addition, engine torque rise now is 20%, an increase of one-third. Over-all engine performance has been greatly improved by the addition of a Turbocharger.

NEW DIMENSIONS AND WEIGHT. The new D8 is heavier—it weighs 47,000 lb., over 2 tons more. It has 84" track gauge, 5,505 square inches of track on the ground with standard 22" track shoes. The new D8 has 19⅝" ground clearance—50% more than ever before—and the most in its class.

NEW LIFETIME LUBRICATED ROLLERS AND IDLERS. Rollers and idlers are lubricated at the factory and will require no further lubrication until rebuilding. Special metal floating-ring seals keep lubricant in, dirt out, for lifetime lubrication. Proved by over 5 years of testing.

NEW DRY-TYPE AIR CLEANER. Most efficient air cleaner ever developed. Removes at least 99.8% of all dirt from intake air during *every* service hour. Can be serviced in five minutes. Cuts maintenance time by as much as 75%. Efficient at all engine speeds and operating conditions.

NEW MACHINES AND DEVELOPMENTS IN '59!

CAT DW20 and DW21 SERIES G TRACTORS

Now 345 HP for faster cycles—plus new high-capacity LOWBOWL Scrapers for bigger loads!

New horsepower, new rimpull, new speeds, new scraper ratings and new stronger structures—that sums up the impressive list of improvements made in these big new Caterpillar rigs. Compared with the models replaced, the new 345 HP (max. output) four-wheel DW20 and two-wheel DW21 Series G Tractors deliver 12% higher rimpull. This increased rimpull provides up to 20% faster travel speeds under similar haul road conditions. Compared with previous models, the new LOWBOWL Scrapers (No. 456 and No. 470 Series B) have 8% greater capacity. Their new ratings: 19.5 cu. yd. struck; 27 cu. yd. heaped. Also, the new No. 482 Scraper for use with the DW20 has 24 cu. yd. struck capacity, 34 cu. yd. heaped.

To handle this increased HP and increased capacity, both tractors and scrapers have been improved in design and structure. The tractors, for example, have stronger final drive gears and improved transmission shifter forks. The scrapers have stronger bowls, draft frames and aprons. All these and other improvements result in better service life, less maintenance and cheaper dirt. Geared for today's highly competitive market, these high-capacity rigs meet your needs for moving more dirt at lower cost than ever!

CAT D7 SERIES D TRACTOR

Packed with more power and more features to deliver even more production at lower cost!

More productive ability and greater operating economy—that's the result of advances in the new D7 Series D to make it an even better investment than the efficient machine it replaced.

Here are some of the key features that put the new D7 way out front in its class. A new Turbocharged Caterpillar Diesel Engine develops 140 flywheel HP, 112 drawbar. Improved torque characteristics increase its lugging ability 30%. The D7 also features a new dry-type air cleaner, new lifetime lubricated rollers, new lubrication system for transmission, new stronger final drive gears and optional in-seat starting. With all these and other new advances, certain time-tested features have been retained. To mention one, there's the exclusive oil clutch, which delivers 2,000 hours of service without adjustment.

For day-in, day-out hard work, no other machine of comparable size can match the new D7 Series D. It is way out in front of all others in its class!

POWER SHIFT TRANSMISSION

for D8 and D9 Tractors

On-the-go shifts under full load in a split second. Changes speed, reverses direction with finger-tip control lever—and no clutching!

This rugged new transmission, with an exclusive new design, provides production highs never before possible with a track-type tractor. Here's why: 1. It combines for the first time the flexibility and anti-stall features of torque converter with the operating snap of direct drive. And because of its direct drive characteristics, it is more efficient than other power shift designs. 2. With one control lever and no clutching, it reverses direction . . . changes speed . . . smoothly . . . under full load . . . in a fraction of a second.

Power shift control is mounted to the operator's left. One selector lever (black knob) eliminates gearshift, forward-reverse and flywheel clutch levers. The safety lever (red knob) prevents accidental engagement. The selector lever moves in a "U" path to various positions. Shifting is so easy the operator just naturally gets more work out of the tractor even on the toughest jobs.

One ton of ruggedness, Cat power shift transmission stands up under the heaviest earthmoving duty. See it demonstrated on D8 and D9 Tractors.

SYNCHROTOUCH TRANSMISSION CONTROL

for DW20 and DW21 Tractors

An advanced new way to shift gears easier and faster. Operator simply dials desired gear for automatic, split-second, touch-and-go response!

This remarkable Caterpillar advance combines economical direct drive transmission with the easiest, fastest shifting possible. An optional arrangement for DW20 and DW21 Tractors, SynchroTouch Transmission Control permits effortless shifting of transmission gears by means of a gear selector placed near the operator's right hand.

To shift up or down, the operator simply moves a selector switch to the desired gear. In less than a second, it is engaged. The standard foot clutch is retained, but is used only when starting from a standstill.

Fully tested on the job, Caterpillar SynchroTouch Transmission Control gives you these important benefits:

1. Faster shifting—for faster cycles and more payloads per hour.
2. A big reduction in operator fatigue—for more daily production.
3. Economical direct drive transmission—uses standard DW20 and DW21 transmission and clutch components.
4. No special maintenance required.

See the DW20 and DW21 in action with this great new optional control!

CAT No. 933 SERIES F TRAXCAVATOR

New power, new capacity, more features and new ruggedness increase output as much as 22%!

From every standpoint, the new No. 933 Series F is a bigger producer than the Series E model. You can count on it for more work cycles per hour, more yards production per day, easier operation and greater profits per job.

The Series F has many new features. Here are just a few. It has a new 1⅛ cu. yd. bucket, longer bucket reach and greater digging depth. Its new 52 HP Cat Engine is shorter, more compact with new engine balancers for smoother operation. It provides new operator comfort with convenient grouping of easy-operating controls and instruments, ample leg room and new comfortable seat. Its new power train, with 4 forward speeds (1.51 to 5.48 MPH) and new 3.67 MPH reverse boost production. And the time-proved, dependable oil clutch is standard.

Match the No. 933 against anything in its size. You'll be convinced: here's the most excavator-loader for your money!

ACHINES AND DEVELOPMENTS IN '59!

AT DW20 and DW21 ERIES G TRACTORS

ow 345 HP for faster cycles—plus new high-apacity LOWBOWL Scrapers for bigger loads!

horsepower, new rimpull, new speeds, new scraper ings and new stronger structures—that sums up the pressive list of improvements made in these big new terpillar rigs. Compared with the models replaced, the 345 HP (max. output) four-wheel DW20 and two-el DW21 Series G Tractors deliver 12% higher rimpull. is increased rimpull provides up to 20% faster travel eeds under similar haul road conditions. Compared with evious models, the new LOWBOWL Scrapers (No. 456 No. 470 Series B) have 8% greater capacity. Their w ratings: 19.5 cu. yd. struck; 27 cu. yd. heaped. Also, e new No. 482 Scraper for use with the DW20 has 24 . yd. struck capacity, 34 cu. yd. heaped.

To handle this increased HP and increased capacity, both ctors and scrapers have been improved in design and structure. The tractors, for example, have stronger final drive gears and improved transmission shifter forks. The scrapers have stronger bowls, draft frames and aprons. All these and other improvements result in better service life, less maintenance and cheaper dirt. Geared for today's highly competitive market, these high-capacity rigs meet your needs for moving more dirt at lower cost than ever!

The "ALL NEW" No. 619-No. 442 and the NEW SERIES F DW15-No. 428

Select the tractor-scraper most suitable for your normal working conditions—the two-wheel No. 619 or the four-wheel DW15!

The new No. 619-No. 442 shown here is the first two-wheel rig with advanced design and performance features for any job. Its Turbocharged Cat Engine provides 225 HP and high torque rise, ideal for lugging under load and fast acceleration. Its LOWBOWL Scraper handles 14 cu. yd. struck, 18 cu. yd. heaped. It has a 30.2 MPH operating speed, plus ground-hugging roadability never before found in a two-wheel tractor of comparable size. In every way, it is a versatile "all job" rig.

Design improvements assure greater productivity than ever in the well-known four-wheel DW15-No. 428. New strength has been added for increased service life in bevel gear and pinion, differential and front wheel spindles. Along with these and other advances, this new Series F unit retains features that made it top performer in its class. It provides 200 HP (max. output) and high torque rise. Its LOWBOWL Scraper handles 13 cu. yd. struck, 18 cu. yd. heaped. The DW15 is also a versatile unit. It can be unhitched from the No. 428 and used to haul other units, among them the Athey PR15 Rear Dump Trailer.

BIG No. 14 TURBOCHARGED MOTOR GRADER

Most versatile BIG grader ever developed for high capacity both on power and control applications!

The first and only Turbocharged motor grader, the No. 14 packs 150 HP. Operates at the highest practical working speeds with either a 12′ or 14′ moldboard. Weighs in the 30,000-lb. class. And with all this power, speed and heft, it has the extra strength to deliver the high availability for which Cat Motor Graders are famous.

Big features include ample throat clearance between moldboard and circle for greater loads; the exclusive Cat-built oil clutch for longer life; the new dry-type air cleaner for greater efficiency; and big 14:00-24 tubeless tires all around.

You can put this versatile unit to work *profitably* on many different applications, such as:

—power applications like heavy grading, heavy ditching, rough grading and bank sloping.

—control applications like light spreading, surface maintenance, fine grading and light blading.

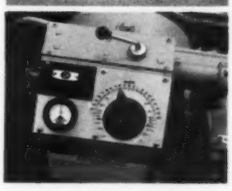
Because of this versatility, you don't have to pick "spots" for it. The No. 14 pays off in a big way on any big job. Name the date—your Caterpillar Dealer will demonstrate!

Turbocharged Engine

New 6-cylinder Turbocharged Cat-[illegible] Diesel develops 150 HP, with unequa[illegible] lugging ability — an 18% torque ri[illegible] Only motor grader in its class with "[illegible] make" engine. A dry-type air cl[illegible] removes 99.8% of dirt from air d[illegible] every service hour.

Heavy-Duty Circle & Moldb[illegible]

New design provides big load-carry[illegible] capacity. Circle and 12′ x 27″ x [illegible] moldboard are the strongest in the [illegible] motor grader class. A 14′ moldboard [illegible] optional. Exclusive, new Cat machine[illegible] blade controls provide precise, fast blad[illegible] adjustment and positive hold.



Preco Automatic Blade Cont[illegible]

Optional on the No. 14. Another [illegible] clusive for Caterpillar Graders! Opera[illegible] selects desired slope on dial. Trans[illegible] torized for freedom from maintenan[illegible] and adjustment, the unit automatica[illegible] maintains blade slope within ½″ in 1[illegible] The Preco control increases operator ef[illegible] ciency on a wide range of applicat[illegible]

Caterpillar Tractor Co., General Offices, Peoria, Ill.; San Francisco, Calif., U.S.A.

CATERPILLAR

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DIESEL ENGINES • TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

BORN OF RESEARCH
PROVED IN THE FIELD

...e way to get around ...ndation excavation:

Drill foundation shafts

The foundation contractor for a 28-story New York apartment building bypassed some regular operations by using a Calweld earth drill to excavate foundation shafts. Concrete is placed directly in the belled-out shaft; the high percentage of clay and rock in the overburden made it possible to forego use of forms or sheeting to support shaft walls.

...h earth drill simplified the job of ...rming the foundation for a 28-story ...artment building on a lot bounded ...y 68th and 69th streets and Lexing...on and Park Avenues in New York City.

This rig, a Calweld Model 200-A, ...nk 48-inch-diameter shafts through ...e site's overburden to the underly...g rock stratum. Here, the shaft was ...lled out in the rock to about a 6-...ot-diameter base. Without the use ...f any forms or sheeting to support ...e shaft walls from cave-ins (the ...ay and rock content of the overbur...en made this possible) the founda...ion contractor, Civetta Excavating, ...nc., New York City, managed to place ...oncrete directly into the shafts for ...e foundation.

One of the biggest advantages of ...ing the self-propelled earth drill ...owed up during the sinking of the ...undation shafts along the perimeter ...f the building line. By simply sinking ...afts and filling them with concrete, ...ivetta eliminated the need to drive ...raced sheeting along the building ...ne to support the surrounding streets. ...is would have been necessary if ...nventional excavation methods were ...ed to reach rock and forms were ...ilt for the foundation columns.

This latter type of construction was ...ed before the Calweld rig was ...rought to the job.

Drill specifications

Driven by a 120-hp Chrysler In...ustrial engine, enclosed in a sheet-...eel housing, the power unit is ...quipped with an instrument panel, ...adiator, 16-gallon gas tank, and a ...-volt electrical system. The 1¼-...ubic-yard bucket drill, which picks ...p material as drilling is carried on, ...s powered by a carbon-steel ring gear ...hat rides on 224 ball bearings ¾ inch ...n diameter. This ring gear turns the ...ucket drill by means of a telescoping ...elly bar and develops a maximum ...orque of 64,000 foot-pounds. THE END

Federal-aid provisions in state highway laws

■ Highway Research Board Special Report 48, "Federal-Aid Provisions in State Highway Laws: an Analysis," is available for $2.40 from the HRB, 2101 Constitution Ave., Washington 25, D. C.

Details are given on state-federal cooperation, assent statutes, the national system of interstate and defense highways, and public-utility relocation. Two appendixes give a summary of statutes by state and a table of cases cited.

AASHO meets amid reports of probe

Incoming AASHO president, David H. Stevens, chairman of the Maine State Highway Commission.

The bogey of a federal inquiry into the highway program created an uneasy atmosphere at the usually tranquil annual gathering of the American Association of State Highway Officials, which was held this year in Boston, Mass., October 12 through 16. Nearly 1,300 delegates, guests, and visitors overflowed the meeting rooms at the Statler-Hilton Hotel to participate in a variety of committee sessions covering the many phases of highway activity, as well as to hear members of the U. S. Congress voice their opinion on the federal highway program.

A difference of opinion among the Washington lawmakers developed during the opening day of the 45th annual meeting on the subject of highway financing. Sen. Pat McNamara (D., Mich.) stated that the pay-as-you-go principle of financing the federal interstate program "has a nice homey sound, it somehow oozes respectability and thrift. The only trouble is that hardly anyone from the household up to the federal government practices it, and if they did, our whole economic system would collapse." The Michigan senior senator said that he was opposed both to the increase in the gas tax and to the excise tax on automobiles.

"As a senator from the state which is the home of the automobile industry," said Sen. McNamara, "I have long recognized the inequity of excise taxes on automobiles." While offering no alternative plan to taxation for raising highway revenue, Sen. McNamara stated that the Byrd Amendment plagues the program, for it "requires the Secretary of Commerce to limit actual apportionments to the states to the available revenue in the Highway Trust Fund." Calling Sen. Harry F. Byrd (D., Va.) a "fiscal conservative," Sen. McNamara asserted that there is at present $16 billion in outstanding automobile installment credit, representing more than 10 million automobiles.

"As a senator from Michigan," Sen. McNamara reiterated, "I don't need to tell you how unhappy we would be if these 10 million auto owners had decided to wait until they had the full purchase price. Or if they decided to buy their cars a bumper or headlight at a time on a pay-as-you-go basis."

Scherer speaks

Rep. Gordon H. Scherer (R. Ohio) said that he disagreed with any abandonment of the pay-as-you-go formula, and that he himself, at the request of President Eisenhower, had introduced the legislation to increase the federal gas tax. "I did so," said Congressman Scherer, "to save the highway program—to avoid more deficit spending, which would accelerate the inflationary spiral. I didn't introduce the measure to continue a program out of which they were planning at the time to cut the heart."

The Ohio congressman referred to a special committee, appointed by the White House, which is engaged in preparing recommendations on issues

Congressmen apprise highway officials of pending investigation; technical session discusses end-result spex

Commissioner A. N. DiNatale (center), Massachusetts Department of Public Works, is flanked by the delegates from Hawaii. In the usual order they are Fred L. Schumacher, district engineer, Kauai; Daniel D. Moon, deputy attorney general; John C. Myatt, deputy state highway engineer; and Oliver K. Wong, traffic safety engineer.

for a 1961 report on federal-aid highway financing. According to Rep. Scherer, "This special committee will try to find justification for eliminating the Interstate System within industrial areas, but if it cannot do this, then it will definitely recommend substantial curtailment of this part of the highway program. Such a policy would be a rape of the original Clay report and the 1956 highway act." Rep. Scherer also stated that "if this new policy of eliminating or de-emphasizing the urban sections of the Interstate System had been known, the one-cent increase in the federal gas tax would never have passed the Congress."

Rep. Scherer warned the AASHO members of talk that "the depleted condition of the trust fund was due to the fact that the highway engineers had gone hog-wild with the people's money. It was charged that there were too many fancy, costly, and overly complex cloverleafs and interchanges; that you fellows were deliberately picking out the highest-priced real estate through which and over which to run the new roads. Charges of waste, inefficiency, and even fraud in the administration of the highway program were hurled about with some abandon."

To investigate these charges, Rep. Scherer continued, the chairman of the Public Works Committee, Rep. Charles A. Buckley, (D., N. Y.) appointed a new special roads subcommittee composed of 12 Democrats and 6 Republicans, although the membership of an investigating committee is usually divided fairly equally between the majority and minority membership. Rep. Scherer stated that the chairman favored a pet project that would add $4 billion to the program by reimbursing states for previously built toll roads; but that the previous subcommittee could not support such reimbursement payments at this time, since all available money is needed to build new highways to meet the critical traffic needs of this country.

Rep. Scherer said the investigating subcommittee will probe into how state highway officials and the Bureau of Public Roads are handling the program. It will also, according to the congressman, determine whether there is any waste, inefficiency, and fraud.

The existence and the work of the investigating subcommittee were confirmed on the second day of the conference by the unscheduled appearance on the program of Rep. John A. Blatnik (D., Minn.) who is chairman of the subcommittee. Rep. Blatnik had received a belated invitation from A. E. Johnson, executive secretary of AASHO, to address the convention session of the Committee on Administrative Practices. Rep. Blatnik stated that there is bound to

(Continued from preceding page)

be extravagance, waste, and graft, at least on the fringes, whenever you have a multibillion-dollar program. He said the probe was necessary to maintain public confidence in the highway program, but that it would not be a "witch hunt."

According to the Congressional investigator, the U. S. Bureau of Public Roads will be probed first. His staff will be augmented; consultants will be hired; and hearings should begin in January. The investigation will take from two to four years, it is expected. A system of spot checks will be employed by the special "watchdog" subcommitee in its investigations of contract bidding, land acquisitions, financing, and right-of-way. Rep. Blatnik's staff includes some members who helped uncover corruption in some elements of the labor movement.

Ellis L. Armstrong, Commissioner of the Bureau of Public Roads, welcomed the investigation as being a good thing for the public. He pointed out that the bureau is continually checking on the highway program with cost accounting and engineering studies and that it expects no scandals to develop.

Nothing to fear

Bertram D. Tallamy, Federal Highway Administrator, told the delegates, "I trust that you will cooperate to the fullest in these inquiries into our activities. I'm confident that we have nothing to conceal or to fear and that the reviews may give public officials and the people generally a better understanding of our problems. The end result may well add stature to the highway official through public recognition of the importance of his job."

Tallamy pointed out that at the last AASHO meeting in San Francisco, December, 1958, he had reported completion of about 1,700 miles of new interstate highways and that that figure had now risen to 2,880 miles. He urged the delegates to devote greater public-information efforts to the highway program and to conduct themselves so that their "acts, policies, or decisions should be capable of standing on their own merits in the light of official inquiries."

Outgoing AASHO president Ralph R. Bartelsmeyer, chief highway engineer, Illinois Division of Highways, said that it is "incumbent on us in the states to provide the kind of service and leadership so that the

Rep. Gordon H. Scherer of Ohio addresses the first general convention session. He is a member of the House Public Works Committee.

Ellis L. Armstrong, Commissioner, Bureau of Public Roads, was key speaker at a session of the Committee on Public Information.

A delegate from Maine, Dorothy Lyman, public information officer for the state highway department, was on a panel discussion.

move toward nationalization of the state highway systems will not be tolerated by the people. We must do all we can to prevent federal aid from becoming over-all federal control."

End-result spex

The contractor's and engineer's viewpoints on end-result specifications were aired at the first session of the Committee on Construction. M. C. Harrison, president of the Harrison Construction Co., Pittsburgh, Pa., traced the historical relationship between the two groups back to the year 1585 in Rome, when an architect, Domenico Fontana, undertook to move an ancient Egyptian obelisk from one location to another. He succeeded, became famous, and later designed and built bridges, roads, and hydraulic works.

Harrison attributed the rigid controls under which contractors work to the excessive use of the unit-price method of quoting that was adopted after World War I, and to the publishing of these prices on the theory that it would eliminate cheating or collusion. "The result was, particularly in public works," said Harrison, "that any jackleg who could read and obtain a credit and a bond could have a contract by the simple expedient of cutting the prices of the contractor who had the temerity to set the standard."

The first congressman ever to receive the Bartlett Award is Rep. George H. Fallon of Maryland (left). It was presented by J. N. Robertson, retired District of Columbia director of highways and present treasurer of the American Road Builders' Association.

Then, according to the Pittsburgh contractor, the engineers wrote into their specifications methods to be employed for their fulfillment so that "poor and ignorant people" could get the job done. "Many a so-called contractor," said Harrison, "instead of growing up gradually as all other living things do, took a leap into the future in the hope of making a profit. The temptation was too great, what with already established prices and built-in methods. Of what need was experience?"

Harrison concluded by stating that the criterion of a contractor is the ingenuity and ability he uses in performing the work necessary to complete the design thus created at the lowest possible cost.

Engineer's viewpoint

The engineer's views on end-result specifications were set forth in a paper prepared by W. J. Walsh, construction engineer, Colorado Department of Highways, and presented by Mark U. Watrous, chief engineer. "What we are attempting," wrote Walsh, "is the elimination of unnecessary restrictions on the contractor that handicap him in producing the quality of work desired, with his own particular organization and methods, and thereby prevent his benefiting from his own resourcefulness.

"We should, by all means, keep control over quality of materials. This we do by stipulating in the specifications that materials furnished for the job must meet certain test requirements." This includes such items as cement, paint, asphalt, and many others. "But, surely, we do not tell material manufacturers how they shall produce these materials," Walsh added.

"An end-result specification should not imply that a contractor is permitted to install in the work materials of his own choosing, regardless of quality. But we would create a serious situation should we stipulate certain brand names, thus restricting the purchase to one source. The situation is not too much

←For more facts, circle No. 278

Back-dragging with the clam, like a bulldozer in reverse—then pushing with forward dozing action—the TD-15 Four-in-One tears down a foot-thick old brick-and-concrete masonry wall. Fessenden & Co., El Cerrito, California, is clearing an old Berkeley residential site for a new apartment building. This contractor owns four International Drott 4-in-1's!

Using 4-in-1 bulldozer action with clam raised, the Fessenden operator "turns on" the TD-15's 115 hp, and "blasts out" another section of concrete wall. "It's a hard-digging dozer, a wonderfully fast loader that can pick up heavy debris in the clamshell—our 4-in-1 is the one machine that does everything!" states operator Elmer Hope.

Genuine pry-over-shoe break-out action enables the Fessenden's 4-in-1 to exert the tremendous force of 39,200 lbs., and up comes an "anchored" section of concrete foundation. This one, big-capacity unit does the demolition, loading, and grading without benefit of power shovel or blasting crew help!

The lone contractor speaker was M. C. Harrison, Harrison Construction Co., Pittsburgh. He addressed the Committee on Construction session presided over by W. C. Williams (left), Oregon state highway engineer.

Rex M. Whitton (right), Missouri's chief engineer presents the Thomas H. MacDonald Award to Alfred E. Johnson, AASHO executive secretary and a former chief engineer, Arkansas State Highway Department.

(*Continued from preceding page*)

different if we stipulate the type of machine, thus restricting the available source to a few manufacturers."

Poor control of construction

Robert W. Sweet, district engineer, New York State Department of Public Works at Watertown, declared that he has not found too many altruistic contractors and that the whole industry depends on the courage and integrity of the inspectors who supervise the actual construction. He showed a series of slides that illustrated the results of poor control of construction. These examples included poor maintenance of traffic during construction; segregated aggregate on a concrete paving job; incorrect placing of wire fabric near a road joint; the use of a faulty bituminous distributor in macadam work; and many others.

Sweet attributed these shortcomings to a loss of pride of workmanship on the part of both contractors and inspectors, and to a general feeling of indifference toward results. Speaking of the construction superintendent, the D. P. W. engineer asserted that "The only way he can show a profit is by continuous, high-volume production. He is in the position where his big machines are driving him, rather than he driving them. With the head-office accountants analyzing his reports, he would be less than human if he didn't now and then take a calculated risk of lowering quality safeguards as much as he can in favor of high production. . . . Our defense against these practices is, of course, good inspection."

Highway awards

The 29th presentation of the Bartlett Award, given annually since 1931 to "some individual who has made an outstanding contribution to highway progress," went to Rep. George H. Fallon (D., Md.), who is chairman of the House Subcommitee on Roads. He is the first member of Congress ever to receive the award. In making the presentation, J. N. Robertson, retired District of Columbia director of highways, hailed Fallon as the "prime mover and the coordinator" in the passage of the 1956 highway act, which established the great National System of Interstate and Defense Highways. Fallon also wrote the 1959 highway act, enactment of which forestalled a serious disruption of the federal-aid highway program.

In accepting the award, Rep. Fallon warned the highway officials that progress must be made in the 1960's at a better rate than was achieved in the 1950's if highway construction is to keep pace with the growth of the country.

The annual Thomas H. MacDonald Award, presented to a highway official on the basis of outstanding contribution to the highway program, went to Alfred E. Johnson, former AASHO president and former chief engineer of the Arkansas State Highway Department. Johnson now has

staff job with the AASHO as executive secretary.

David H. Stevens, chairman of the Maine State Highway Commission, was elected president of AASHO for the coming year to succeed R. R. Bartelsmeyer of Illinois. D. H. Bray, Kentucky state highway engineer, was elected first vice president. The 1960 annual meeting is scheduled for Detroit, Mich., in the latter part of November.

Field trip

On Wednesday of the convention week, the delegates went on an all-day technical and historical tour of Boston and the eastern part of Massachusetts. The trip was made in eleven chartered sightseeing buses. While the caravan was crossing the upper deck of the Mystic River Bridge, three of the buses became involved in a chain-reaction rear-end collision. One of the buses stopped suddenly, and the two following buses rammed into the one ahead. Many of the delegates and their wives were shaken up by the crash, and twelve were rushed to the hospital for emergency treatment. THE END

Convention Jottings

Judged by the applause, the best received AASHO convention speaker was Congressman Gordon H. Scherer. The representative from Ohio is scheduled to participate in a panel discussion with the press during the American Road Builders' annual convention in Cincinnati next month.

After he had warmly welcomed the delegates to his state at the first general session, Massachusetts' Governor Foster Furcolo put in a plug for the presidential aspirations of U. S. Senator John F. Kennedy. Conceding that the AASHO was a nonpolitical gathering, Governor Furcolo said he still wished to point out that Senator Kennedy was building a road for himself to the White House.

Politics is not necessarily absent from state highway affairs. AASHO's Committee on Construction has had three chairmen within a year's time. This naturally disrupts the continuity in sustaining a technical program. Top personnel of some highway departments are sharply affected by a change in administrations after state elections.

AASHO depends on the host state to handle press relations, and Massachusetts was hard put to it to get out releases for newsmen because of the absence of copies of convention papers. It also had to contend with personnel absences caused by two holidays. Both Columbus Day and Yom Kippur coincided with the convention's opening day.

The large attendance at the AASHO convention taxes the facilities of all but the largest hotels. Most meeting rooms for committee sessions were not large enough to accommodate all those wishing to attend. As a result, many delegates were left to roam the halls, while those jammed inside were practically sitting on each other's laps. Some sessions were shirt-sleeve affairs because of the lack of air conditioning in overheated rooms.

For the first time at an AASHO meeting, delegates from all 50 states were in attendance. A total of 717 state highway officials was registered, plus 122 more from the federal Bureau of Public Roads. Guests and visitors numbered 439, bringing the total registration to 1,278. The host state, Massachusetts, naturally led in registrations with 89, followed by Kansas with 30 and Michigan with 27. Florida and Missouri were close behind with 25 delegates each.

Arc Welding Foundation presents design awards; opens new competition

■ The James F. Lincoln Arc Welding Foundation has presented $5,000 to 66 students in 21 colleges and universities this year in its annual design competition for college engineering undergraduates. The first award of $1,250 went to Seppo J. Viikinsalo of the University of Minnesota for his design of a fire hydrant redesigned for welding.

A second award of $1,000 went to James Galinsky of the University of Illinois for his design of a welded hammerhead support. Robert Silman of New York University received $500 as third prize for his design of a welded-aluminum hyperbolic paraboloid roof structure.

A similar competition has been announced for the current school year. It closes July 1, 1960. A rules booklet is available from The James F. Lincoln Arc Welding Foundation, Cleveland 17, Ohio.

For more facts, use coupon or circle No. 280→

Management

by GEORGE E. DEATHERAGE, P. E.
construction consultant

Safety Department:

Sanitary code, first aid, and safety rules

When sleeping and eating facilities are maintained on construction projects, a strict sanitary code must be created and enforced. Regulations for such installations are under the control of the local Department of Health, and copies of the sanitary code may be obtained from them.

Every construction project, no matter how small, should be provided with one or more first-aid kits. These can be purchased from local druggists. The Associated General Contractors' Manual recommends that a fully equipped 16-unit kit be provided for each 25 persons employed. Periodic inspection should be made to insure that the kits are fully supplied and kept in a sanitary condition.

Every job should have on the payroll one or more employees trained in first aid, life saving, and water safety. This training should be taken by foremen and timekeepers if the job is not large enough to maintain a full-time physician.

Reporting injuries

All injuries, no matter how small, should be reported to the State Industrial Accident Commission in the state in which the construction work is being done. Even small injuries, such as deep scratches, may become infected and result in blood poisoning. All injuries are to be reported on the same day that the injury occurs. If the reporting is delayed, it is more difficult to secure accurate details, the names of witnesses, etc.

Reports to the commission must be made in duplicate, one of which is to be put in the contractor's file. Fatal or serious injuries should be reported to the commission by telephone or wire. The commission requires that attending physicians report periodically as to the treatment and progress of an injured person.

No employee should be allowed to return to work unless the attending physician has supplied the workman with a written release stating that he is fully recovered and able to resume his normal duties. State Accident Commissions have regular procedures covering this matter; these should be consulted and strictly followed.

Construction occupations

In all construction operations, it is necessary for the superintendent, foremen, and safety engineers to understand the duties of each employee in connection with his trade classification. The safety man must be familiar with these duties in order to provide properly for the employees' protection; the same holds for the timekeeper, who takes care of payroll and insurance classifications.

This matter has been studied by a committee of the Associated General Contractors of America, Inc., 26[illegible] and E Sts. N. W., Washington, D. C. and standard trade classifica[illegible] have been established. These are published in a pamphlet entitled "Construction Operations," a report on the occupational classification of construction employees. Copies should be in the hands of key personnel.

Pamphlets on proper safe practices, for any trade classification, are available from The National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

Safety practices

Every construction firm should have its own standard-practice procedure

←For more facts, circle No. 281

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This is the forty-ninth of a series of articles on Construction Management by George E. Deatherage, P. E., The National Schools of Construction, Satsuma, Fla. The articles are based on an eight-volume "Manual of Advanced Construction Management" published by George E. Deatherage & Son, Construction Consultants, Satsuma, Fla.

safety, and copies of it should be produced in sufficient numbers to supply all the supervisory and key employees in the field and office.

Actual accident-prevention work must be done on the job, and the foreman is the key to the situation. It is up to him to guide the workmen into safe practices and to keep hazards to a minimum.

Each foreman in the construction department automatically becomes a permanent member of the Safety Committee, of which the safety engineer is chairman. Meetings might be held twice a month, when general safety requirements are discussed and recommendations made for correction. The minutes of safety meetings should be typed and distributed to all members of the committee and other interested parties. Suggestions for correction of hazards noted should be taken care of at once, without orders from the safety engineer.

The assistant superintendent, at each meeting, may appoint three members to act as an Inspection Committee for the 2-week period before the next meeting. They should inspect all work under construction during this period and report any unsafe practices and existing hazards.

New employees should be instructed about the hazards of the work and be given a copy of the general safety rules. The Inspection Committee investigating each accident sets forth the findings as to cause, with recommendations to prevent recurrence, at the next regular safety meeting. The First-Aid Department makes a report on each accident to the superintendent of construction, who turns the reports over to the Inspection Committee for investigation.

Safe-practice rules

A set of safe-practice rules, which includes every possible hazard, should be set up by the committee. The rules should cover everything from tools to handling materials. The safe-practice rules might cover the following requirements.

All tools, equipment, and materials must be in good condition.

The foreman should use his own judgment in assigning men to do certain work and be sure they are capable. Safety belts should be supplied when necessary, or if requested by the workman.

Danger signs should be posted about open trenches and wherever men are at work overhead; watchmen should be stationed whenever signs are not sufficient.

When the need arises, each employee should be provided with and wear goggles, which must be sterilized after each use.

Use heavy planks underneath a crane that is working on soft ground.

Inspect all cables frequently and replace any that are worn, frayed, or partially broken. When a cable is removed in a coil, roll it out on the ground so that it will be straight before it is put on the sheaves. If cable is received on a reel, the reel should be mounted on a spindle or turntable and the cable properly unwound. Avoid kinking and untwisting of the cable. Treat all cables with compounds of cylinder oil to keep them pliable and to prevent rust.

The cable must be securely fastened to the drum, either by zinc plugs or by suitable clamps, and at least two full turns of the cable should remain on the winding drum at all times. All horizontal cables less than 10 feet above floors should be properly enclosed. Cable clamps should be spaced so that the distances between centers is equal to six times the cable diameter. Inspect all cables and ropes used about buildings or other parts of work where acid is handled. If there is any doubt about the condition of a cable, test it with a 25 per cent overload.

Wheelbarrow runways should be of 2-inch plank and at least three planks wide. If the runways are 5 feet high or more, handrails should always be provided.

Remove rubbish and old materials from the building and premises.

Railings must be erected around all floor and wall openings. Erect suitable coverings to protect workmen from overhead dangers. Barricades should be erected wherever necessary to keep out the public.

Inspect chains frequently; watch for small cracks and avoid kinking. Be sure that hooks for each class of work are correctly designed to lift the load without overstraining any part of the hook. Sheaves of the largest practical diameter should be used for all cable installations. They should be frequently inspected and kept well

oiled. Test cast-iron sheaves and pulleys with a hammer to make sure they are not cracked or broken. Do not allow a gate block to be used without being closed and hooked.

Scaffolds must be built of sound material, and they should be erected and taken down by experienced men. Do not overload, jump on, or allow material to be dropped on a scaffold. In winter, remove snow and ice before starting work, and sprinkle sand or another material on the scaffold to prevent workers from slipping. Every man going upon any scaffold should be required to satisfy himself of its safety.

Use of ladders should be discouraged. However, if they are used, they should be substantially built, set level, and well secured. Do not paint them, since this covers defects; use linseed oil. Destroy defective ladders.

Shoring and walls must be protected against impact from swinging loads being hoisted. See that jacks are of sufficient strength to carry the load. No one should ever get under an object supported solely by jacks.

Workmen must ride inside trucks, not on running boards or fenders. Responsibility for the condition of a truck rests upon the operator.

Water pails must be kept in a clean and sanitary condition. Use only paper cups.

Open flames must not be permitted where there are explosion hazards. No metal welding or cutting should be done in locations where there is an explosion hazard without the specific permission of the superintendent of the department for which the work is being done.

Forms and stripping

Protruding and flying nails are the chief source of accidents on form work. See that the men use hammers with faces in good condition. Care should be taken by workmen in cutting lumber to see that the ends do not drop on the floor below. Avoid having ends of loose plank or boards project over the edge of floors or beams.

Before stripping forms, place a sufficient number of shores to support the centering about to be stripped. Only men actually engaged in this work should be permitted in the area where stripping is being done. Forms should not be removed prematurely. Be sure that concrete is properly set, not frozen. Ledgers should be fastened to shores to prevent the centering from falling to the floor.

Material of all kinds should be piled or stored in an orderly manner. Cement must not be piled more than 10 bags high, except in storage built for the purpose. The first four end bags should be cross-piled in two separate tiers up to the fifth bag, where a step back of one bag in every five should be made. Beginning with the fifth bag, only one cross tier will be necessary. The back tier, when not resting against a wall of sufficient strength to withstand the pressure, should be stepped back one bag in every five, the same as the end tiers. Cement in outer tiers should, in all cases, be piled with the mouths of bags facing the center of the pile. When cement is removed from the pile, the length of the pile should be kept at an even height, and necessary step-backs every five bags must be left.

Men handling reinforcing steel should wear heavy gloves. Reinforcing steel should be stored in piles of different lengths and sizes, so that each size can be readily obtained. When bending is done on the job, provide a strong bench and have an even dry surface for men to work on. Structural steel must be placed so that there will be no danger of a worker tripping and falling.

If a crane is being used to unload material, see that the men are familiar with the signals used by the operator and warn them to be watchful. When rail cars are being unloaded, crews should use extreme care so that men will not be caught between the load and the side of the car. Men should not stand or pass under the line of travel of the load. When gangplanks are used between cars and platforms or piles, cleats at the lower end of the plank, or pins through the end of the gangplank, should be used to prevent sliding.

Typical safety rules

Here is a typical list of safety rules adopted for the protection of employees and approved by a state compensation commissioner:

1. Report all injuries to the first-aid office immediately, no matter how trivial they seem.

2. Wear goggles when grinding, cutting, welding, or chipping steel or concrete; when working in dusty places or on acid lines; when using a hammer on concrete; or when doing any other job where eye protection is known to be a necessity.

3. Safety guards, removed for repairs or adjustment, must be replaced

before machinery is started.

4. Do not use unsafe tools or ladders. Report the condition to the foreman or safety department.

5. Do not remove lights or make any kind of electrical repairs unless you are an electrician working under foreman's orders.

6. Horseplay on the job will not be tolerated.

7. Shut down all machinery before cleaning moving parts. Do not wear gloves or loose clothing around moving parts of machinery.

8. When you see a warning or danger sign, be sure you can proceed safely before you go ahead. Failure to do so is to invite injury deliberately.

9. Don't go up or down a ladder without the free use of both hands. If material has to be handled, use a rope to lift it, leaving the hands free.

10. Fire-fighting equipment should be used for fire-fighting purposes only. Never place obstructions within 15 feet of fire plugs or hose houses.

11. Before starting work on machinery or equipment, post signs to prevent anyone else's starting the equipment while you are working on it.

12. Oxygen helmets are obtainable at the safety department for the use of workmen; also fresh-air masks for employees working in gas-laden tanks or pits.

(Next month's article will deal with the "Safety Department: Stresses and safety factors.")

Allis-Chalmers makes two appointments

■ Allis-Chalmers Mfg. Co., Milwaukee, has named Russell A. Hedden works manager of manufacturing for the Industries Group at the West Allis (Wis.) works. He succeeds E. W. Bonness, who has been appointed consultant to the director of manufacturing of the Industries Group.

Scholarship fund to aid dealer-course students

■ A total of $20,270 has been pledged to Clarkson College of Technology, Potsdam, N. Y., for a scholarship fund to provide financial aid for students who enroll in the construction-machinery distribution program. The first program of its kind to be offered by an accredited college or university in the United States, its chief aim is to prepare young men to apply their engineering and business knowledge to the marketing of construction machinery.

Planned with the assistance of the Associated Equipment Distributors, the program leads to a bachelor of science degree. The curriculum is composed of 32 credit hours of engineering, 30 of mathematics and science, 29 of business administration, 27 of liberal studies, and 14 of military science or physical education, and electives.

Data on service life of metal-pipe culverts

■ "Embedded Flexible Metal Pipe Culverts: Corrosion and Deformation" is the title of Bulletin 223 from the Highway Research Board.

The first paper describes the methods and results of a comprehensive survey of corrugated-metal-culvert corrosion in California. Examination of some 7,000 metal culverts in the northern portion of the state indicated that the previously estimated service life of 10 to 100 years would depend on the fundamental factors of abrasion and corrosion as these influences develop in the geographic location involved.

The second paper, on the influence of soil characteristics on deformation of embedded flexible pipe culverts, describes a laboratory investigation of a model soil-culvert system to determine if the modulus of soil reaction is a function of any of the commonly recognized and easily measured soil properties. The results of preliminary tests are discussed.

Price of the well illustrated bulletin is 50 cents. It may be purchased from the HRB, 2101 Constitution Ave., Washington 25, D. C.

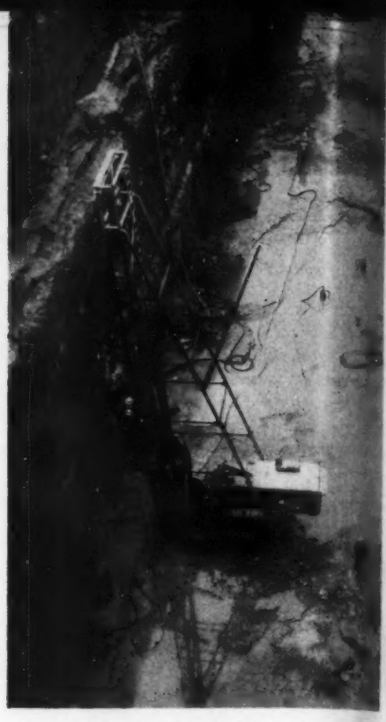
Construction bonds discussed in booklet

■ The Surety Association of America has published a 44-page booklet entitled "Bonds of Suretyship," which discusses the nature and functions of construction contract bonds. It contains the three sections on bonds from the 1958 edition of the "Handbook of Architectural Practice" of the American Institute of Architects. Five appendixes reproduce the Bid, Performance, and Payment Bonds approved by the institute as its official forms, and the Performance and Payment Bonds of the General Services Administration, U. S. Government.

Single copies of the booklet are available without charge from the Educational Department of the Surety Association of America, 60 John St., New York 38, N. Y.

Outer limits of the 8,000-foot-long conduit trenches for the Niagara Power Project are line-drilled by this Ingersoll-Rand unit with four drills riding on the tractor. The 3-inch-diameter holes are sunk on 9-inch centers. Within line-drilling limits, other drills sink 3½-inch holes.

Blasted rock is excavated by a Lima 2400 shovel with 6-yard bucket and loaded out to a Euclid rear-dump. Excavated material is being used to build up the embankment along the Niagara River for the proposed Niagara Parkway. Lines at right carry water and compressed air.



A converted Ingersoll-Rand drilling rig is used to put down holes for anchor rods that will combat any uplift pressures on the conduit floor slab and walls. The two drills riding the tall mast can be raised, lowered, or inclined to any angle to drill the blast holes.

Shaping conduit waterways —a big job at Niagara

"Form train" used for concrete work in both 8,000-foot-long sections

After more than a year of battling with existing utility lines and traffic routes, Merritt-Chapman & Scott Corp., New York, N. Y., has finally been able to concentrate activities on what it is supposed to build—the $65,962,000 river intake structure and 8,000-foot-long section of conduit waterways for the Niagara Power Project.

This contract, the second largest awarded for the $720 million job at Niagara Falls, N. Y., involved the building of industrial water intakes for the existing plants along the Niagara River; the relocation of a maze of water, sewer, and electrical utilities that ran above, over, and under the ground; and the relocation of three railroads and five major thoroughfares through the town of Niagara Falls. (See "Work on Industrial Water Conduit Clears Way for Constructing Niagara Intakes, Waterways," C&E, May, 1959, page 6.)

Conduit excavation

While work progressed along the shore line, M-C&S started a huge fleet of excavation equipment working on the 8,000-foot waterway section of the contract. This calls for the con-

Before the 2½-foot-thick floor slab is laid for the conduit, a concrete seal is placed in the trench. Concrete is being handled by a Marion crane with Gar-Bro 4-yard bucket. Note the temporary 3-span bridge, background, for traffic over the trench.

The "form train" rides on rails laid on the conduit floor slab. Three sets of 40-foot-long forms are used in each conduit. In the lead is a work platform used to set and grout anchor rods. This is followed by first-lift wall forms, for the bottom 21½ feet of wall and second-lift forms to complete the 43-foot walls. Last, three sets of sections form haunches that support the roof arch.

struction of two reinforced-concrete horseshoe-shaped conduits by the cut-and-cover method.

The inside dimension, measured between the vertical side walls of each conduit, is 46 feet. The over-all height, between the bottom slab of the conduit and the crown of the 3-hinged arch of the roof, is 66 feet. M-C&S is still excavating trenches ahead of the concrete work north of the intake structure for each of the parallel conduits. The conduits are about 200 feet on centers. The side walls and bottom slabs of the conduits have minimum thicknesses of 2½ feet and are being formed directly against the exposed rock of the trenches. Though there is some earth overburden present, the trenches are, for the most part, being cut out of solid rock.

Line-drilling

M-C&S is using a fleet of Gardner-Denver Air Trac drills, powered by G-D compressors, to handle all the rock excavation on the project. The contractor is shaping the conduit trenches by line-drilling the outer limits with 3-inch-diameter holes on 6-inch centers. This drilling is handled by a track-mounted Ingersoll-Rand unit equipped with four drills riding a horizontal frame.

Within the line-drilling limits, Gardner-Denver Air Tracs sink 3½-inch holes in a 6×8, 7×8, or 8×8-foot pattern to remove the trench rock in four lifts. The first lift, about 25 feet deep, reaches the roof-arch haunch elevation. Then two succeeding lifts, each about 18 feet deep, follow to bring the trench to about 8 feet from the bottom. A fourth lift is used, even though it involves the removal of only 8 feet of rock, to attempt to get closer to the designed trench floor elevation.

One shovel per trench

The contractor has two shovels, one in each trench, to excavate the blasted rock and load the fleet of Euclid 27-ton rear-dumps. A Lima 2400 with a 6-yard bucket and a Marion 111-M with a 4-yard bucket handle this assignment.

Where the conduit excavation crosses a vehicular thoroughfare, the contractor has built 3-span 400-foot-long steel bridges to carry the traffic over both conduit trenches, as well as over the area separating the trenches. This area is now being used as a haul road by rigs carrying concrete and excavation in both the intake and conduit areas.

The concrete-batching setup has been located at the northern end of the conduits, the farthest point from the intake structures, because of a lack of available land elsewhere in the project. This distance, plus the congestion just north of the intake structures, made it necessary to eliminate any bottlenecks along the haul route. Until June of this year, M-C&S had special permission to haul the conduit excavation over city streets and four railroad tracks until the overpasses were completed. This material was hauled to the intake area and along the river front in order to build

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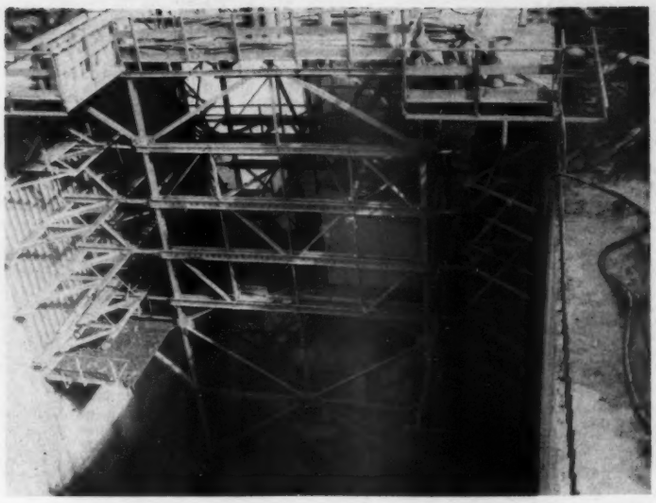


The second-lift wall forms complete the 43-foot-high wall of the conduit. The form jumbo rides on steel rails supported by timber ties that are not fastened to the concrete. The platforms are moved forward on the rails by tugger hoists located at the base of the platform supports.

A haunch form section is positioned with the steel sections on their sides. The circular keys will form the 3-hinged arch of the conduit roof. A completed section of arch is in the background. The forms are designed so that concrete can be placed continuously instead of in two quarter sections.

Four yards of concrete is discharged by a Gar-Bro bucket for the haunch section of one of the conduits. Air to operate the bucket is furnished by one of the lines running along the berm of the trench.

(*Continued from preceding page*)

up the embankment for the proposed Niagara Parkway.

By bridging the vehicular traffic over the between-trench haul road, M-C&S has eliminated the intermingling of its equipment and local traffic.

Conduits anchored

Each 43-foot-high conduit wall, as well as the floor slab, is being tied to the rock trench by No. 11 reinforcing bars doweled 7½ feet into the rock. The side walls have seven inclined dowels, and the floor slab has 8 vertical dowels.

These lines of dowels are being drilled by a subcontractor on 8-foot centers along the entire length of the conduits to help overcome any uplift caused by hydro-static pressure. The subcontractor is using a converted Ingersoll-Rand drilling unit equipped with two drills mounted on a tall mast. The drills, which can be raised or lowered, work in the vertical position or can be inclined to any degree to sink the anchor-rod holes.

Conduit concrete

M-C&S started concrete placement for the conduits this summer, and the work is now progressing from the northerly job limits to the south, toward the river intake structures. Excavation is still continuing ahead of this work.

A work platform that precedes conduit forming is used to scale the face of the trench walls and to position the anchor rods in the drilled holes. Concrete for the conduit floor slab is then placed across the width of the trench in four sections. This concrete, having a minimum thickness of 3½ feet and encasing longitudinal and transverse drains, is cured by being covered with a layer of damp sand within 24 hours after placement.

The damp sand has to be left in place for at least 14 days, but M-C&S is keeping this protective covering in place until after a conduit section is completed.

The contractor has four complete sets of Blaw-Knox floor forms for each conduit. Each section of forms is 40 feet long, but by staggering the various sections on a conduit, M-C&S is working a longer stretch of floor slab.

After the floor slab is placed, steel rails are set atop timber ties transversely placed on the concrete but not fastened to it. The parallel rails, used to support the steel form jumbos, are about 25 feet on centers. Since the short timber ties are not fastened to the concrete, a spacer timber is positioned occasionally to maintain the proper distance between the rails. The Blaw-Knox form platforms are moved forward on the rails by means of trigger hoists located at the base of the platform supports.

"Form train"

A first-lift work platform leads the elaborate "form train" for each conduit. From this platform, which rises to the elevation of the first lift, 21½ feet above the floor slab, a crew sets and grouts the steel anchor rods. This platform is followed by three 40-foot-long sets of first-lift wall forms and a high-lift work platform used to grout the anchor rods for the top 21½-foot lift for the wall.

Another three sets of second-lift wall forms then follow to complete the 43-foot-high conduit walls. The wall forms are followed by another three sets of 40-foot-long, 10-foot-high sections to form the haunches that support the 3-hinged roof arch. Six sets of top and bottom arch forms bring up the rear of the "form train" so that a single concrete placement can be made for the hinged arch.

Wall forms are stripped after 72 hours, at which time the concrete surface is sprayed with a white-pigmented curing compound. All three sections are then moved ahead three blocks, or 120 feet at a time.

The lead sections for the first and second lift forms have two bulkheads. Another section has one bulkhead; a third section has no bulkhead. With this setup, the contractor has built-in versatility and a more efficient operation. The form sections equipped with two bulkheads take the longest time to move and set up for concrete placement because of the carpenter labor required to seal the bulkheads to the trench rock on both ends of the section. It normally takes about eight hours to move a section and place concrete.

The other sections are easier to set up because little or no carpenter labor is involved. Arch forms are left in place for at least 6 days and then stripped and moved ahead.

The arch forms are designed so that a single pour, rather than two quarter pours, can be made to form the hinged connection at the top. A steel filler, shaped to form the circular key of the hinge, actually separates the arch into two quarter sections. M-C&S expects to average about 200 feet of conduit per week, once the crew becomes familiar with the handling of the form sections.

Drains formed

The contractor has been forming vertical drains on 10-foot centers through the conduit walls by an ingenious technique. This method not only eliminates the time-consuming setting of vertical drain tile against

(*Continued on next page*)

Material excavated from the Niagara River is cast into place by a Marion 183 crane equipped with an 8-yard dragline bucket to build up the embankment for the new Niagara Parkway.

Gardner-Denver Air Tracs sink blast holes along the face of the intake locations, which are enclosed by a cofferdam holding back the Niagara River. Concrete intakes will be formed along the face of the rock and will divert the water through the conduits to the Lewiston power plant.

Work on the intakes is being done while the conduits are shaped. The Manitowoc crane is using a 4-yard bucket to place concrete in forms for the north retaining wall of Intake Structure No. 2.

(Continued from preceding page)

the irregular walls of the conduit trenches, but it also reduces the material costs and produces a smoother drain between the rock and the concrete wall.

Long, enclosed rubber tubes are inflated by compressed air and laid directly against the vertical sides of the conduit trench. The tubes, imported from England, are held in place by wire mesh fastened to the trench rock. This mesh actually forms the vertical drain by preventing the passage of concrete during the wall pours. After the concrete sets up, the tube is deflated and removed from within the mesh, leaving just a smooth vertical opening from the bottom of the trench to the top of the wall pour.

This operation is repeated throughout the second-lift wall pours and through the haunch pours. These drains are necessary to permit any ground water, seeping through the trench rock, to flow down to the 12-inch half-round laterals and the 24-inch half-round longitudinal tile drains placed at the bottom of the trench. One of the major advantages of the rubber tubes is that they can be re-used indefinitely throughout the project.

Concrete cooled

M-C&S is required to maintain the concrete mix at no more than 70 degrees F when pouring directly against rock, and at a temperature of no more than 60 degrees F for all the other pours. To maintain these temperatures, the contractor is cooling the coarse aggregates at the batch plant.

The stone is brought from the stockpile through a reclaiming tunnel and run over a 42-inch enclosed cooling conveyor, then dumped onto the inclined conveyor feeding the storage bins of the batch plant. The total length of this bypass conveyor is about 550 feet; as the stone travels the 307-foot enclosed length, it is sprayed with refrigerated water. Spray nozzles are on 5½-foot centers; a 2-inch-thick insulation keeps out heat. At the end of the enclosed portion of the conveyor, a Hewitt-Robins vibrating screen separates the water from the stone. The water is recirculated to the cooling plant, designed by the Lewis Refrigeration Co., Seattle,

A Johnson batch plant equipped with four Koehring 2-yard tilting-type mixers supplies the concrete for the project. Aggregates are hauled from the reclaiming tunnel to the plant by the inclined 30-inch conveyor.

Refrigerated cooling water is sprayed onto aggregates riding over this 307-foot enclosed conveyor to reduce the temperature of the concrete mix. A Hewitt-Robins vibrating screen at the end separates the water from the aggregates.

Wash., and the stone is deposited on the inclined reclaiming belt that feeds the plant.

Aggregates are delivered to the plant by dump truck and charged into a ground-level hopper feeding a 30-inch conveyor. This belt charges a 200-foot-long shuttle conveyor, running 50 feet above the ground, that forms the stockpiles for the sand and stone. Running beneath the stockpiles is the 500-foot-long reclaiming tunnel, equipped with a 30-inch conveyor that feeds the aggregates either to the inclined batch-plant conveyor or the aggregate-cooling conveyor.

The Johnson batch plant is equipped with four 2-yard tilting-type mixers that give the plant a 200-cubic-yard capacity per hour. Concrete is dumped into Gar-Bro 4-yard air-operated concrete buckets. A pair of buckets are mounted on a converted Euclid or International hauling unit used to transport the mix to the various crews along the project.

Personnel

Merritt-Chapman & Scott's intake project is under the supervision of Myles C. McGough, vice president. E. A. Pasha, project manager, heads the field staff, which includes T. J. Slattery, assistant to the project manager; John L. Dugan, general superintendent; and Duke Grkovic, project engineer. William Denny, executive vice president in charge of the firm's Construction Department, is in overall charge of construction operations at the Niagara Power Project.

Fred McKune is the resident engineer on the intake project for Uhl, Hall & Rich, Boston, Mass., the consulting engineering firm in charge of design and construction supervision for the Power Authority of the State of New York. THE END

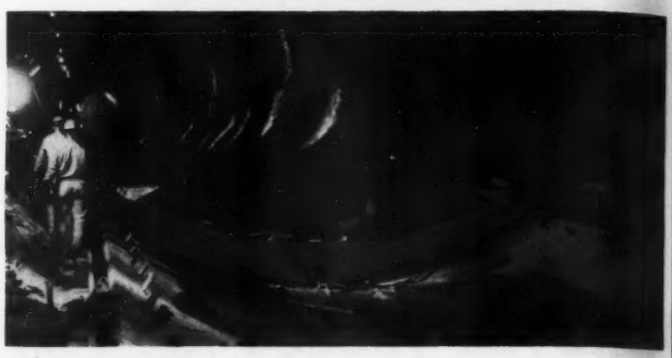
Electric Steel Foundry expands sales management

■ Harry Ratkowski has been appointed manager of sales, castings, and high-alloy products in the Midwest and along the lower Atlantic seaboard for the Central Sales District of Electric Steel Foundry Co., Danville, Ill. Earl Berger will continue as manager of sales, construction, logging and crushing equipment in the Midwest and the East. Gene Ottarski will replace Ratkowski as office manager in Central Sales.

Concrete pumped to forms for the Glen Canyon tunnels

by RALPH MONSON, field editor

Tunnel lining for the right and left diversion tunnels at Glen Canyon Dam is a 3-step operation. The first step is construction of curbs on both sides to provide a base for the lining forms. Workmen are cleaning up the invert preparatory to lining.



After the curbs for the left diversion-tunnel invert section are completed, a screed, riding rails on the curbs, is used to form the invert itself. Concrete for most of the invert pours was delivered by Pumpcrete to a screed car that handled actual placement.

Once the reinforcing steel is in place, the Blaw-Knox form is ready to advance. This is the 2,941-foot-long left diversion tunnel, some 34 feet higher than the right tunnel, which is at about river level. Both tunnels will be needed to handle peak flows of the river.

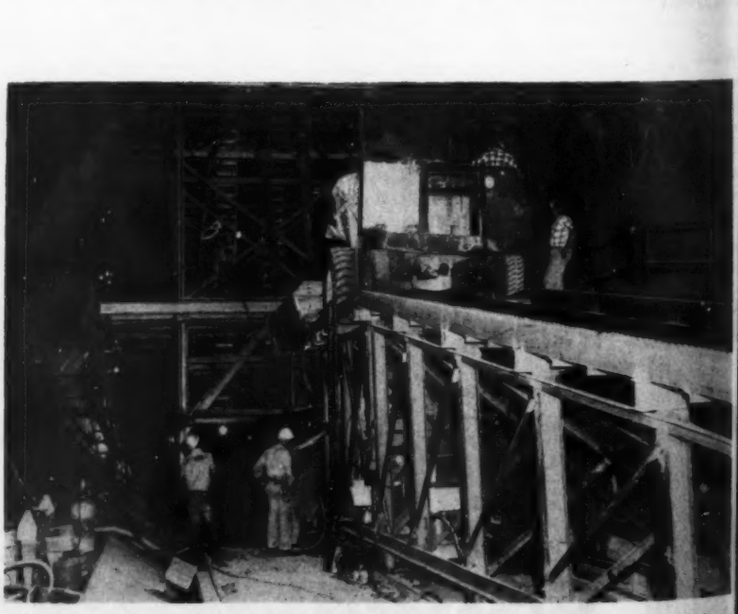
Pilot shaft is excavated upward from diversion tunnel to allow start of drilling for inclined spillway tunnel

Turning the flow of the Colorado River into the right diversion tunnel last February climaxed more than two years of tunneling and lining operations in the pink Navajo sandstone walls of Glen Canyon. While the diversion of the river opened the way for the start of construction on the dam itself, crews are still at work on some of the 18,000 feet of tunnels that will serve Glen Canyon Dam.

Lining the big 45-foot-diameter diversion tunnels and building the spectacular inclined spillway tunnels were among the most interesting of recent tunneling operations.

The right diverison tunnel carried the low river flow in February (See "Long Bolts Support Roof of Right Diversion Tunnel at Glen Canyon Dam Site," C&E, December, 1957, page 38), but it takes the combined capacities of the right and left diversion tunnels to carry the river's peak flows. Both of these tunnels have finished inside diameters of 41 feet. The right tunnel is 2,740 feet long, and the left is 2,941 feet long. The invert of the right tunnel is about at river level, but the left tunnel is some

When a form has been jacked into position, the bulkhead is placed and workmen fill in the spaces between the standard bulkhead and the irregular tunnel walls. The Pumpcrete riser line goes to the top of the form.



Four yards of concrete is dumped to the Pumpcrete hopper by a Koehring Dumptor, which uses this inclined truck ramp. Dumptors are supplied with the mix by 4-yard buckets lowered into the canyon by a 25-ton cableway. Truck-trailers shuttled between the concrete plant and the cableway with the concrete buckets.

…feet higher. This means that the left tunnel will come into use only when the river stage is high enough to practically fill the right tunnel.

The downstream portions of both diversion tunnels serve the dual purpose of diversion during construction and spillway for the finished dam. Inclined tunnels were drilled down from the spillway intake channels to meet the diversion tunnels. When the dam is completed, the upstream portions of the diversion tunnels will be blocked with concrete, and the lower portions will become the spillway outlets.

The right diversion tunnel was excavated under a prime contract by Mountain States Construction Co., Denver. The left tunnel excavation was a part of the Merritt-Chapman & Scott Corp. prime contract and was done by Frazier-Davis Construction Co., St. Louis, Mo., under a subcontract. The right and left inclined spillway shafts were excavated by Northwood, Inc., Vancouver, B. C., and Frazier-Davis, respectively, also under subcontracts. M-C&S handled all of the concrete lining operations with its own forces.

Bethlehem Pacific ¾-inch 6 and 8-foot rock anchor bolts are being installed by workmen on the jumbo to hold the sandstone in place. More than 7,000 mine bolts were installed on 4-foot centers for the job.

Lining diversion tunnels

The lining of the diversion tunnels was a 3-step operation. A curb was first constructed on either side to provide a base for carrying the lining forms. The invert was formed by a screed riding on rails on the curbs. The remainder of the arch was then placed, with Blaw-Knox steel forms being used.

The curbs were formed with wood forms, and the concrete was placed by conveyor or bucket from a specially equipped Koehring Dumptor. The usual Dumptor body was replaced by a 4-cubic-yard hopper fitted with a bottom discharge chute and clam gates. The concrete, discharged onto a short inclined conveyor, was carried up into the curb forms. In some cases, the concrete was discharged from the hopper into a laydown bucket that was hoisted to the forms by a Krane Kar.

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The Rex double Pumpcrete that pumps the mix to the form through two lines is mounted on flanged wheels that ride the rails in the tunnel invert. The truck ramp, background, also rides on flanged wheels, and both Pumpcrete and ramp can be rolled ahead as one unit whenever the form advances.

One of the toughest jobs was done in the spillway tunnels. This right-bank excavation inclines 53 degrees to meet the diversion tunnel.

An electric winch operates the inclined railway that leads into the spillway tunnel. At left, is a Gardner-Denver air tugger that positions arch steel.

At the bottom of the shaft, workmen set one of the steel arch ribs. Exposed rock is covered with woven-wire fencing held in place by Bethlehem ¾-inch bolts.

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The invert pour was made by a Blaw-Knox invert screed car riding on rails bolted to the top of the curbs. The car was propelled by a cable anchored into the curb ahead and attached to a Beebe 15-ton winch on the screed. A Chicago Pneumatic air wrench actuated the winch. As the screed car moved ahead, it shaped the invert and struck off the concrete to a smooth surface.

Concrete is pumped

Concrete for most of the invert pours was delivered to the screed car by Pumpcrete. A Rex 200 double Pumpcrete was set up in the tunnel, and an 8-inch line was run ahead on each curb to the screed car. The discharge lines were arranged so that most of the concrete could be deposited in special pockets at the high sides of the screed. It was vibrated down from these pockets to form the complete section. Some concrete was also deposited ahead of the car so that the screed was always working against a small excess of concrete.

The concrete for the tunnel lining was produced in the C. S. Johnson plant set up on the right bank as a temporary source of supply until the larger plant could be installed to produce concrete for the dam. This was a fully automatic plant with 5-compartment 450-ton bins and two 4-yard tilt mixers.

The mix was discharged from the plant into buckets carried on low-bed trailers pulled by International trucks. The trailers delivered the buckets to a 25-ton cableway that M-C&S had set up to serve the upstream portals of the tunnels. The cableway picked a bucket off the trailer and delivered it to an unloading platform at the bottom of the canyon near the tunnel portal. A workman tripped the gate of the bucket and dumped the load into a Koehring Dumptor waiting under the platform.

The Dumptor brought the concrete into a tunnel, climbing a portable

A chain conveyor brings reinforcing bars to the ceiling of the tunnel. They are bent and welded into a mat that is held in place by the roof bolts.

Drilling the 41-foot inside diameter of the left diversion tunnel is handled from two platform jumbos mounted on truck beds. These carry ten hydraulic boom drills.

An Allis-Chalmers tractor-dozer and a Michigan tractor shovel handle cleanup work at the portal of the right diversion tunnel.

ramp to get up high enough to dump the load into the Pumpcrete hopper. This type of operation was used for most of the invert concrete and for placing concrete in the arch forms. In a few sections, where there was no reinforcing in the invert, the Dumptors brought the concrete right up to the screed car. As they dumped the mix in front of the car, workmen shoveled some of it into the pockets to keep the section full.

Steel forms shape arch

Blaw-Knox collapsible steel forms shaped the arch of the tunnel for concrete placement. These forms could be lowered by center jacks and expanded or retracted by ratchets. The 10-foot-long sections were bolted together into 60-foot sections for the diversion-tunnel portion.

In the downstream part of the diversion tunnels, which will later serve as spillway tunnels, the concrete section was heavier and contained a great deal of reinforcing. In this area, the form length was restricted to 40 feet.

The job of setting the maze of reinforcing steel in this section required the use of special jumbos that were fitted with power-driven arms to raise the bars into place and hold them while they were being tied.

With the form in place and bulkheaded, the Pumpcrete began pumping concrete in through the openings in the crown of the form. Tremies inside the form led the concrete down to the bottom as it was consolidated by air vibrators. Three vibrators were attached to the outside of the form on each side, while more were used inside. The concrete was pumped in at a rate of about 45 to 50 cubic yards per hour, but it took approximately 16 hours to place roughly 600 cubic yards in the 40-foot spillway tunnel section.

The forms were left in place for a 16-hour curing period before they were stripped and reset. When the form was removed, the concrete sur-

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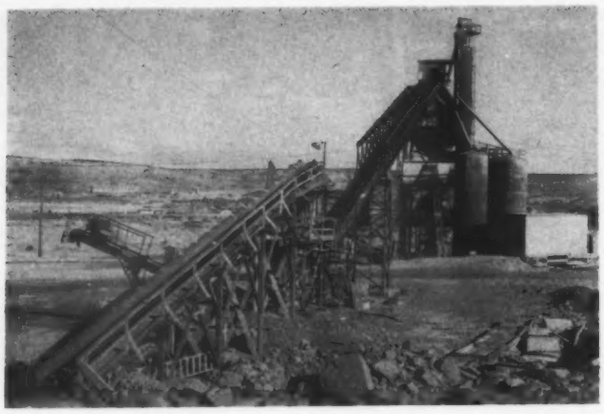

This C. S. Johnson plant supplies concrete for tunnel linings long before the big plant supplying dam concrete was ready to go into operation. The aggregate feed comes from the recovery tunnel that will supply the big plant.

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face was sprayed with Hunt Process white-pigmented curing compound. Under average conditions, the crew made three pours per week.

Excavating spillway shafts

The spillway intake channels were excavated into both banks of the canyon like two huge thumbs. Although these excavations go down about 200 feet, it is still some 560 feet down to the diversion tunnels. Drilling the steeply inclined shafts to this depth was one of the most difficult tunneling operations of the project.

Excavation of both of these shafts was subcontracted from Merritt-Chapman & Scott by Frazier-Davis. The latter, in turn, sublet the excavation of the right spillway shaft to Northwood, Inc., and did the left shaft with its own forces.

Northwood started in the roof of the diversion tunnel and excavated a 7×14-foot shaft upward on the center line of the spillway shaft. This was at an angle of 53 degrees with the horizontal.

As the inclined raise was mined out, a center post was installed every 6-foot round, and timber lagging was placed to divide the shaft into two 7×7-foot sections. One of these was used for the manway, while the other served as a rock chute. The crew drove the 560-foot raise in 72 days.

With the raise completed, excavation of the full tunnel began from the top. Twelve-foot rounds containing an average of 200 three-inch holes were drilled by a battery of Crawl-IR and Air Trac drills. Air was supplied by a Gardner-Denver 900-cfm compressor and two G-D 600's stationed at the top of the spillway intake cut. The air was piped down into the shaft.

The holes were loaded with 60 per cent dynamite and detonated with Primacord.

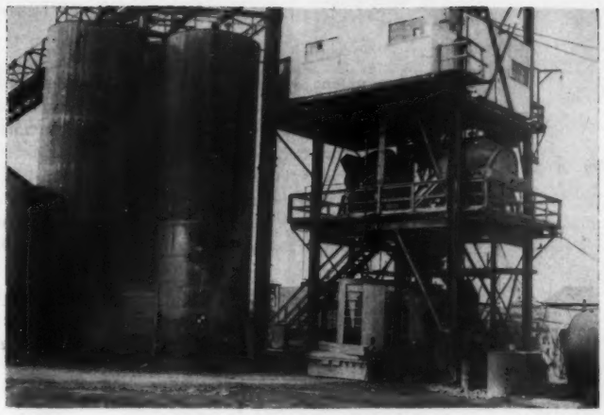
After the shot, two Caterpillar Traxcavators, a 955 side-dump model and a straight 977 model, scooped and dozed the muck into the shaft. The lower end of the shaft had been fitted with air-operated clam gates to facilitate loading the muck into a fleet of Euclid S7 end-dump haul units. The "Eucs" got their full 8-yard load in a few seconds and hauled out through the diversion tunnel to a waste area.

Set steel ribs

As the spillway shaft started down from the floor of the intake channel, it was a horseshoe section measuring a maximum of 107 feet wide and 60 feet high. This reduced to a 46½-foot circular bore at a depth of 133 feet. In this large horseshoe section, it was necessary to set a total of 39 ribs of heavy steel, spaced a maximum of 6 feet apart.

As the excavation was completed for one of these rings, the exposed face of the rock was covered with woven-wire fencing held in place by ¾-inch roof bolts that extended 6 to 8 feet into the rock. The segments of the arch ribs were then juggled into place and bolted together to form the complete rings.

As the excavation continued down, an inclined railway was installed down the shaft. A 50-hp electric-powered Hendrie & Bolthoff hoist pulled the car up the steep incline to bring men, equipment, and supplies up and down. The heavy pieces of arch steel were handled by two Gardner-Denver 5,000-pound air tuggers set up at the top of the incline. Working through snatch blocks hanging from the roof bolts, they raised the steel into place.



...discharges concrete to ...-yd 4-yard bucket on a spe... This is the start of an ... shift; the filled bucket ... delivered to the cableway, ... truck-trailer will return to ... second bucket. After that ... will always be room for the ... from the cableway.

When the excavation was completed, M-C&S took over the placement of the concrete lining, using an operation similar to that for the tunnel lining.

Personnel

The tunnel lining operations by Merritt-Chapman & Scott Corp. were under the direct supervision of shift superintendents Otto Hanssen and R. B. Test, and assistant superintendent Sid Stewart. These men reported to general superintendent Forrest H. Jones and project manager Allen R. Bacon.

Frazier-Davis Construction Co. operations were under the supervision of project manager R. P. "Bob" Molten and project superintendent Joe Burlarlay. Northwood's crew was handled by E. R. "Ernie" Moore.

All of the work at Glen Canyon is under the supervision of the U. S. Bureau of Reclamation staff, headed by project construction engineer L. F. "Lem" Wylie. On the tunnel work, Bill Donahue and Earl Edwards have served as field inspectors. THE END

Engineering mechanics by the vector method

■ "Engineering Mechanics," by Dwight F. Gunder and Derald A. Stuart, is designed for all engineering students. The concept of the fixed vector is used consistently throughout the statics sections, because the authors feel that this approach best meets certain restricting requirements of this portion of engineering mechanics.

The statics part of the book covers basic concepts and definitions, vectors, physical problems, methods of work and energy, friction, and flexible cables. Dynamics, the second part, contains data on motion of a particle (kinematics), particle dynamics (kinetics), relative motion, rigid-body dynamics, and vibrations.

The book may be purchased for $7.75 from John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y.

Hobart Bros. appoints

■ Preston L. Scott is now district sales manager of the southeastern states for Hobart Bros. Co., Troy, Ohio. Scott's territory includes North and South Carolina, Georgia, Florida, and part of Tennessee.

For more facts, circle No. 293→

Urban transportation: planning, development

■ "Planning and Development in Urban Transportation—1959" is available from the Highway Research Board, 2101 Constitution Ave., Washington 25, D. C.

The 66-page bulletin, No. 221, discusses the measurement of congestion in transportation systems; the central business district and its implications for highway planning; new roads for old cities; European experience; general planning, urban renewal, and highways; measurement of central business district change and urban highway impact; and the shoppers' paradise concept.

The price of the bulletin is $1.20.

Avoid legal pitfalls

Scope of federal wage and hour law

THE PROBLEM: *An architectural and consulting engineering firm operated extensively in different states. Its principal offices were in Washington, D. C., and Norfolk, Va. Under the circumstances, were the firm's draftsmen, fieldmen, clerks, and stenographers "engaged in commerce," in the sense that they were covered by the wage and hour provisions of the federal Labor Standards Act?*

THE ANSWER: Yes. (Mitchell, Secretary of Labor, v. Lublin, McGaughy & Associates, 79 Supreme Court Reporter 260, decided January 12, 1959.)

It was conceded by the parties that the firm's professional employees—architects and engineers—were not covered by the wage and hour provisions.

The firm had designed a mobile army warehouse and prepared plans and specifications for its construction. In addition, it designed various construction projects, including the widening of streets at a naval operating base, the extension and paving of airplane taxiways and parking aprons at a naval air station, a local sewerage system in Maryland, the alteration of various hangar facilities at military air bases, the relocation of radio and television facilities, the improvement of state roads and turnpikes, and the repair of government buildings at shipyards. Other activities consisted of preparing plans and specifications for the construction of private projects such as homes, commercial buildings, bus terminals, shopping centers, and the like. The firm had performed certain supervisory functions in connection with the construction of some of the private projects but almost none where governmental agencies were involved.

The government contracts required the firm to produce plans and specifications, copies of which were sent by the governmental agencies to prospective bidders, many of whom were located outside Virginia and the District of Columbia. These plans consisted of drawings and designs and were supplemented by explanatory specifications that contained the information necessary for estimating cost and guiding contractors in bidding under the supervision of the firm's professional members and associates by draftsmen employed by the firm.

In many cases, the information necessary to prepare the plans and specifications was gathered on the site of the projects by fieldmen employed by the firm. These fieldmen included surveyors, transitmen, and chainmen, who often traveled across state lines to get to the projects. On one project, fieldmen from the Washington office went daily to Maryland to gather data for a sewerage project. In addition to the draftsmen and fieldmen, various clerks and stenographers participated in the mechanical preparation of these plans and specifications.

The decision reversed contrary conclusions reached by the United States Court of Appeals, Fourth Circuit. (250 Fed. 2d 253.)

Bidding statute violated

THE PROBLEM: *A Michigan city council negotiated with the lowest bidder for a municipal sewage-disposal plant, after bids were opened and before acceptance of his bid, to obtain a better proposition. During such negotiations, changes were made in specifications resulting in an amended bid of $302,250, which was $7,000 less than the original bid. There was no readvertisement for bids. The council awarded a contract at the amended price, but 16 days later it rescinded the award. The contractor sued for damages on the ground that the city broke its contract. Was the suit properly dismissed?*

THE ANSWER: Yes. The award was void. (Lasky v. City of Bad Axe, 80 N.W. 2d 520, decided by the Michigan Supreme Court.)

By statute, contracts of the kind here involved must be let on sealed competitive bids, and they must be let to the lowest responsible bidder deemed competent to do the work. The purpose of this and similar statutes is to invite competition; to guard against favoritism, improvidence, extravagance, fraud, and corruption in awarding municipal contracts; and to secure the best work at the lowest price practicable. They are enacted for the benefit of prop-

STAKING OUT A FLORIDA CLAIM

Many Marions have played important roles in Florida's rapid development.

Typical is this Marion 35-M which works on seawall, foundation and bridge projects. Here it carried a drag bucket to remove old piling and debris from the site of an old bridge demolished by explosives.

Then it went into crane and pile service to set and drive concrete piling for the new structure.

Marions are busy staking out claims to fame in many states these days for sound reasons your Marion Distributor will be happy to explain.

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No trouble with rock drills on this job reports Ralph E. Mills Company, Frankfort, Kentucky. This drill is lubricated with Gulf Rock Drill 63, a special lubricant for air-operated tools.

Mills men check with the Gulf man. Left to right: W. A. Ferguson, Superintendent, Ralph E. Mills Company; E. W. Mueller, Gulf Sales Representative and Emmett W. Mills, Assistant Superintendent, Ralph E. Mills Company, Frankfort, Kentucky.

Man-made pass through Thorn Hill on the outskirts of Frankfort, Ky., where Ralph E. Mills Co. cut a 400,000-yard slice through solid limestone. All equipment serviced with Gulf fuels and lubricants.

Speeds 400,000-yard cut through solid rock using Gulf lubri

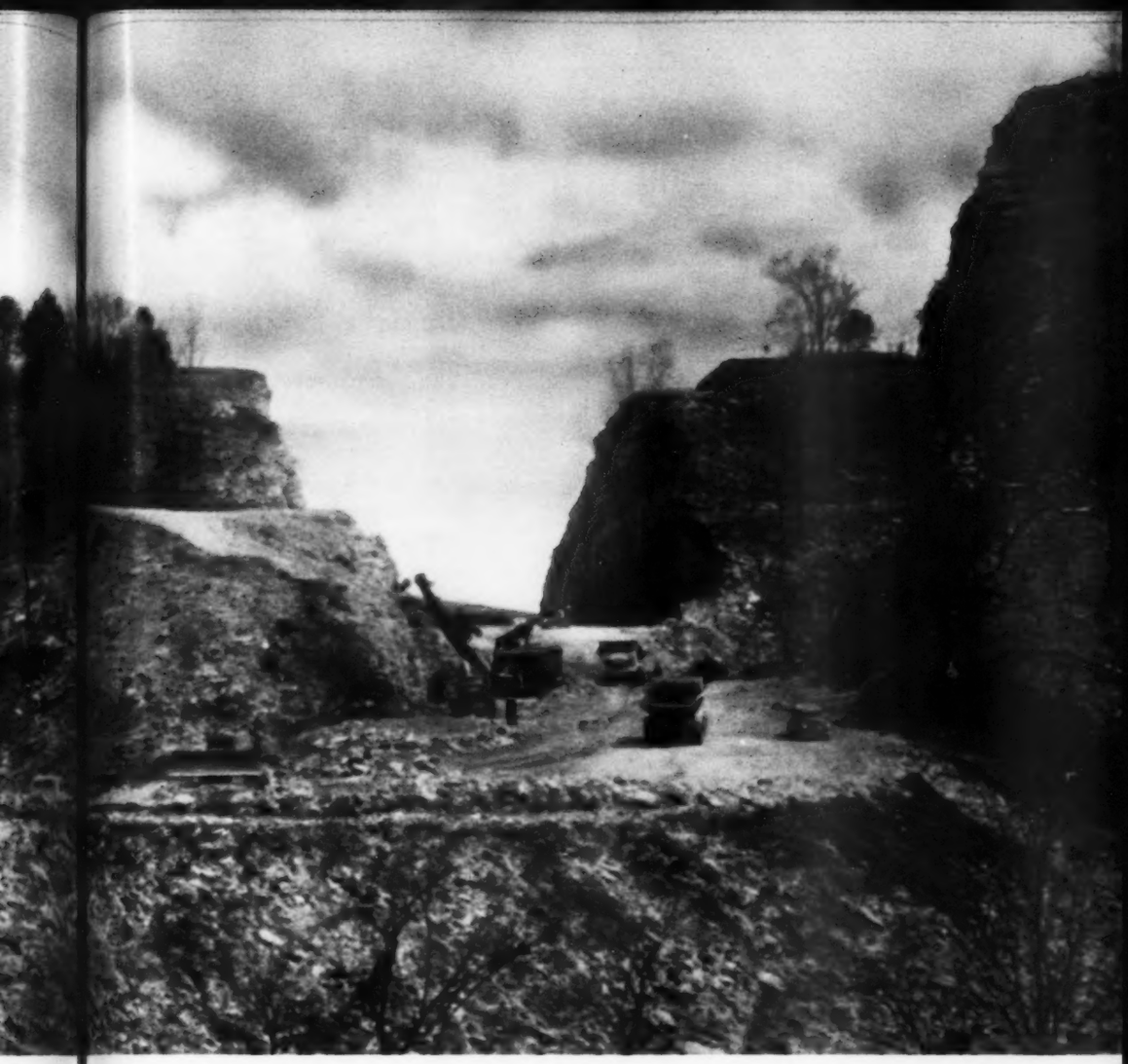
GULF MAKES THINGS RU

One of the largest rock cuts ever made in Kentucky was recently completed by Ralph E. Mills Company, Inc., general contractors. The cut makes way for a modern 4-lane highway through Thorn Hill into Frankfort.

Mills made two cuts through solid limestone, totalling 400,000 cubic yards of rock that weighed 2,800 pounds to the cubic yard. One cut was 104 feet deep, the other 135. They finished the job in 10 months—and with plenty of proof that Gulf makes things run better.

"When you're working rock rather than dirt, equipment usually wears out about 40% faster," says W. A. Ferguson, Job Superintendent on the project. "Some contractors try to beat this by using a special lubricant for each machine.

"But with Gulf lubricants we found that this wasn't necessary at all. With the help of Gulf Lubrication Engineers, we greatly reduced the number of lubricants required on the job—and we saw no signs of premature wear. Our equipment included a Northwest 2½-yard shovel, five 15-ton Euclid trucks, a D-8 Caterpillar, a Gyro-Flow Ingersoll Rand compressor and three Gardner-Denver rock drills. All of our lubrication was done



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RUN BETTER!

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Edited by A. L. H. STREET
Attorney-at-Law

These brief extracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

erty owners and taxpayers, not for the benefit of or enrichment of bidders, and should be so construed and administered as to accomplish such purpose fairly and reasonably, solely to the public interest.

Any variation from bidding specifications will destroy the competitive character of the bid, if such variation is substantial. To be substantial, it must affect the amount of the bid and give the bidder an advantage or benefit not allowed other bidders, and must be an element considered in fixing the price. Who can say what reduction might have been made by the other bidders on the same changes in specifications?

License revoked

THE PROBLEM: *A California contractor undertook to supervise construction on a weekly salary basis. His license was revoked by the Contractors' State License Board on a finding, supported by evidence, that he made a secret and undisclosed profit by submitting false statements to the owner as to the materials and services furnished, exaggerating the costs, and by permitting subcontractors to deviate from plans and specifications in damaging particulars. Was the contractor entitled to a court order requiring restoration of his license?*

THE ANSWER: No. (Hemphill v. Contractors' State License Board, 334 Pac. 2d 287, decided by the California District Court of Appeal, Second District.)

Municipal officers barred from city contracts

THE PROBLEM: *A city councilman had approved the allowance and payment of claims against the city for materials and services furnished by one who was a member of the city board of public works. Was the councilman thereby barred from suing, in his capacity as a resident and taxpayer and on behalf of the city, to compel the contractor to refund what he had received under the contract?*

THE ANSWER: No. (Arthur v. Trundall, 96 N.W. 2d 208, decided by the Nebraska Supreme Court.)

The decision rests upon a statute prohibiting a municipal officer to have any private pecuniary interest in a municipal contract, and declaring such contracts to be void. The case involved services and materials furnished by the board member in his private operation of a tire and battery business. But the law laid down by the court clearly would apply to the furnishing of construction services and supplies.

Miller Act angles

1. THE PROBLEM: *The Miller Act governs contracts with the federal government. It gives a materialman the right to sue a prime contractor with whom he has not been in contractual relationship, as well as the surety on the prime contractor's bond. In order to protect the prime contractor and the surety, the act requires that the materialman give a "notice" to the prime contractor within a certain period of time "stating with substantial accuracy the amount claimed and the name of the party to whom the material was furnished or supplied or for whom the labor was done or performed." Suit was brought on behalf of a materialman against the prime contractor, its surety, and a subcontractor to collect for materials sold to the subcontractor for use on a federal job. Did the materialman give such notice as was required by the law?*

THE ANSWER: No. (United States v. Thompson Construction Co., 172 Fed. Supp. 161, decided by the United States District Court, Southern District of New York.)

The court decided that a letter the subcontractor sent to the contractor stating that the contractor owed subcontractor a certain amount, was not sufficient notice sent by or on authority of the materialman to the contractor to constitute notice under the Miller Act. The materialman could not collect under that act from contractor and its surety for materials sold to the subcontractor.

The court said that the giving of written notice, specified by the statute, is a condition precedent to the right of a supplier to sue on the contractor's payment bond. The writing must be sent or presented to the prime contractor by or on the authority of the supplier; and the writing must inform the prime contractor expressly or by implication that the supplier is looking to the contractor for payment of the bill.

2. THE PROBLEM: *Under the Miller Act, unless there is a continuous contract to furnish materials on a project, the materialman must give notice within 90 days of the furnishing of materials under each separate order. Otherwise, the materialman has no right on the prime contractor's bond. A contractor ordered what he*

avoid legal pitfalls

wanted, when he wanted it, and from whomsoever he chose. Was the 90-day notice requirement applicable to the separate purchases?

THE ANSWER: Yes. (United States v. Allied Contractors, Inc., 171 Fed. Supp. 569, decided by the United States District Court, District of Maryland.)

The court also thus interpreted provisions of the law: to permit recovery under the Miller Act, all the materialman need show is that materials were furnished in prosecution of work; there is no requirement of proof that materials were actually used or incorporated into the contract project. Supplier of materials to subcontractor did not stand in too remote a relationship to secure benefits of the prime contractor's Miller Act bond. An over-the-counter sale on credit is a contract; and there was such direct contractual relationship between plaintiff making such sales and subcontractor as would permit recovery under the Miller Act from prime contractor and its surety.

Sub waived right

THE PROBLEM: *A subcontractor on a federal construction project notified the contractor that he would be unable to continue work unless progress payments were made. Although the payments were not made, the subcontractor substantially completed the work. The subcontractor sued the contractor and its surety to collect the reasonable value of the work performed by the subcontractor as distinguished from the contract price. Was the subcontractor limited to the latter basis?*

THE ANSWER: Yes. (United States v. Americo Construction Co., 168 Fed. Supp. 760, decided by the United States District Court, Mass.)

The court applied the general rule of law that where a party to a contract breaks his agreement in a vital respect, the other party is entitled to treat the contract as being abrogated. But, if the aggrieved party chooses to complete performance, the compensation to which he is entitled will be measured by the contract price and not by the reasonable value of the work done.

Proving damage claims

THE PROBLEM: *A subcontractor had agreed to furnish a drawing showing the exact location of underground installations, and to compact dirt in trenches, but he failed to do so. The prime contractors had to perform this work. Were they entitled to damages, although the dollar amount thereof was not proved with mathematical precision?*

THE ANSWER: Yes. (Wenzler & Ward Plumbing & Heating Co. v. Seller, 330 Pac. 2d 1068, decided by the Washington Supreme Court.)

The court cited a decision of the United States Supreme Court and California legal authority as supporting these rules of law:

The most elementary conceptions of justice and public policy require that the wrongdoer bear the risk of the uncertainty that his own wrong has created.

The constant tendency of the courts is to find some way in which damages can be awarded where a wrong has been done. Difficulty of ascertainment is no longer confused with right of recovery for a proved invasion of the plaintiff's rights.

One who has broken a contract or committed a wrongful act is generally not permitted to escape his liability in damages therefor simply by reason of difficulty in the ascertainment of the damage to the plaintiff. Therefore, when it is clearly apparent that the plaintiff has sustained actual damage from the defendant's wrong, a liberal rule is applied with respect to determining the amount of that damage. Where proof of actual damage to the plaintiff is available, uncertainty as to the exact amount thereof cannot prevent plaintiff from collecting something.

Dragline was damaged

THE PROBLEM: *An insurance policy covered any damage to a dragline resulting from "external cause." The dragline was being operated by an employee in widening a drainage ditch. The hoist lever was engaged, activating a motor-driven mechanism that caused the bucket to be drawn to the outward terminus of the boom. The mechanism continued to pull the boom into vertical position. The employee blacked out and lost all control over the equipment. The boom reached a vertical position, causing it to crash down upon the cab of the dragline by the natural pull of gravity. Did the policy cover the damage?*

THE ANSWER: Yes. (Hawkeye Security Insurance Co. v. Iori Bros., Ltd., 106 So. 2d 916, decided by the Florida District Court of Appeal, Third District.)

The court said that the cause of the damage to the dragline was a direct result of the inability of the employee to act. That one part of the machine struck another part did not show an internal cause but merely indicated internal damage. The fact that the employee, whose inability to act occasioned the damage, was located within the machinery itself does not establish an internal cause.

Insulating blankets, tarps, and salamanders keep work going on this pair of bridges on Interstate 25 near Cheyenne, Wyo. The contractor, with five pairs to build, used insulating blankets to cover deck concrete.

Tarps, blankets protect concrete from cold

Winter construction does not necessarily require a large outlay of expensive special equipment. Riede-Lowe Co., Cheyenne, Wyo., demonstrated this when it built five pairs of bridges on Interstate 25 (U.S. 30) with a minimum of extra facilities.

Two of these pairs carry the highway over the tracks of the Union Pacific Railroad, while the others are highway grade separations. All of the projects are located within a 7-mile section near Granite Canyon, about 3 miles west of Cheyenne.

When this contractor hit the jackpot at Wyoming State Highway Department lettings and became the successful bidder on four separate contracts totaling $676,000 for the 10 structures, there was no alternative but to carry the work right through the winter. Contracts for grading the sections of road between the bridges were in progress simultaneously, and the structures had to be completed by spring so that the grading contractors could complete the approaches.

During the winter, newly placed concrete was protected from the weather by canvas tarps and insulated concrete-curing blankets, while butane-burning heaters supplied additional heat. A butane furnace burner under the water tank at the ready-mix concrete plant heated water for the mix. Other than this, there was little special equipment needed for this winter job.

The jobs got off to a good start in the late summer and fall with the completion of the excavation and footings, and the speed of the work slackened only slightly as winter set

(*Continued on next page*)

B. White butane-burning salamanders under the deck provide heat to keep concrete warm during the curing period. Tarps enclose the area.

A warmly dressed workman sets up Spanall adjustable joists for the deck of one of the bridges. The joists are supported at mid-span on a timber bent. Ends rest on clips anchored into the concrete of pier and abutment.

(*Continued from preceding page*)

in. Columns and caps were placed, steel girders were set on the railroad overpasses, and decks were formed and concrete placed during winter-weather conditions that ranged from mild to severe.

At this high exposed location, more than 7,000 feet above sea level, wind was a big problem. Frigid gales of 20 to 40 mph were everyday fare, and stormy days brought gusts up to 75 mph. Temperatures went as low as minus 16 during the winter. These conditions made work impossible in the exposed locations, and a few days were lost.

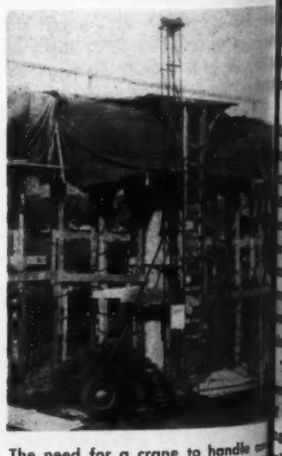
The high winds not only ripped the canvas and blankets but actually blew off the deck forms. After losing part of a deck form to the wind, the contractor tied the plywood decking down as it was placed.

Some of the structures have round pier columns that were formed with steel forms supplied by KC Construction Supply Co., Denver. After placing the warm concrete in these forms, the crews carefully covered them with insulating blankets.

The pier caps were formed with Uni-Forms shored with 4×4's and Ellis shore clamps. Rather than bring a crane to the job to make the small pier-cap placements, the contractor used a Tusky portable elevator to raise the concrete from the ground to the caps in wheelbarrows or buggies. The caps were covered with blankets and tarps to retain the heat for curing. When necessary, additional heat was supplied under the enclosure by L. B. White butane-burning salamanders.

Building the decks

The highway overpass structures had 3-span continuous flat-slab decks, 14 inches thick, with spans of 30, 40, and 30 feet. The deck forms were all shored with Spanall adjustable steel joists. Anchors were cast into the concrete caps to hold the Spanall clips that supported the ends of the joists. Intermediate supports were not needed on the short spans. On the longer spans, timber bents on mud sills provided a center support. The Plyform ¾-inch decking with 2×4 backing was laid di-



The need for a crane to handle concrete placement for pier caps is eliminated by a Tusky portable elevator. It lifts wheelbarrows of concrete to the forms. Shores are 4×4's with Ellis clamps.

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...ctly on the Spanall joists and wired ...curely to them.

The decks of the railroad over- ...sses were 7½-inch concrete slabs ...er the four continuous steel-plate ...irders that spanned between the ...ers. Here, Spanall joists were hung ...m the top flanges of the girders ...o support the Plyform decking.

Timber scaffolding, supported on ...e lower flanges of the girders, pro- ...ded access to this area for work- ...en and also served to support the ...tane-burning salamanders needed ...o heat the concrete. After the con- ...ete was placed, the insulated ...ankets were spread over the surface ...d weighted down. Tarpaulins were ...en tied in place under the girders ...o enclose the space under the deck ...ile still leaving the area under the ...idge unobstructed. This was neces- ...ry, since the trains were operating ...ntinually on these tracks.

For the decks of both highway and ...ilroad overcrossings, the concrete ...as placed either by crane and buck- ...t or by hand-powered buggies and ...heelbarrows.

Mix own concrete

A Ross Porta-Plant batching plant ...d two transit mixers produced and ...livered the concrete. At the plant, ...Hough HM Payloader brought sand ...d gravel from the stockpiles to a ...-yard batching hopper. This hop- ...r is mounted on a scale, and the ...tch was actually proportioned in it. ...s the Payloader placed the proper ...tch weight of each material in the ...pper, an inclined elevator carried ...is material to transit mixers.

Cement was received by truck ...ansport and transferred by screw ...nveyor to a 220-barrel elevated bin. ...n air slide carried the cement to a ...ale for batching, and air-operated ...alves and gates released it into the ...ixer.

Water was obtained from a nearby ...ring and delivered to the plant in ... small trailer tank fitted with a ...eger 1½-inch pump. It was trans- ...rred to a 1,200-gallon tank housed ...n a small portable building at the ...ant. Here, the water was heated to ... degrees by a standard furnace- ...pe butane-burning unit installed ...nder the tank. The water was ...mped and metered directly from ...is tank to the mixers. The concrete ...as hauled up to 3 miles, but the ...lacing temperature was usually be- ...ween 60 and 65 degrees.

The two transit mixers that mixed ...e concrete and delivered it to the ...idge sites were a Rex mixer on ...n International truck and a Transo- ...ixer on a Ford truck. With this ...tup, the contractor placed as much ...s 95 cubic yards in a single pour in ...e day. Homelite and Dart genera- ...rs and electric vibrators helped ...nsolidate the mix. The generators ...lso operated other electric tools.

Two types of insulating blankets ...ere used to cover the concrete. One ...f these had a Sisalkraft outer cover- ...g and the other had an exterior of ...olyethylene film; both had linings ...f rock-wool insulation. Both types ...ppeared to provide good protection ...or the concrete, but the Sisalkraft blankets suffered less damage from the winds. Some of these blankets were used over and over, surviving the entire winter in spite of the rough usage.

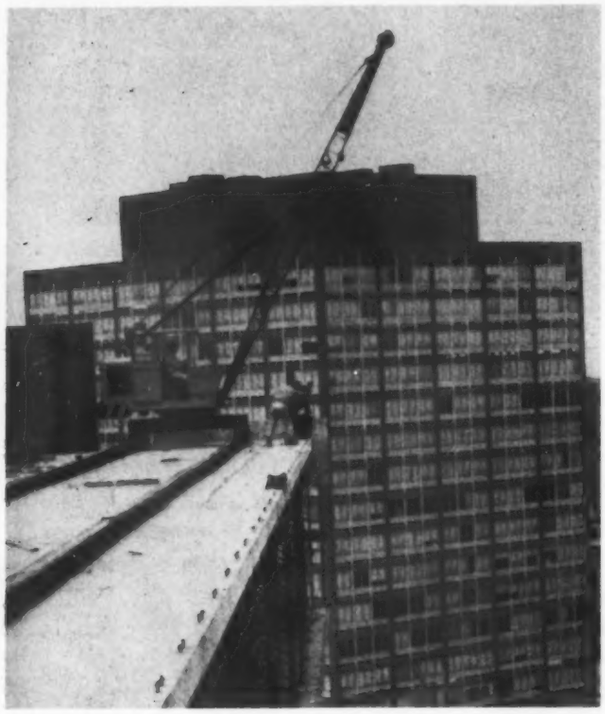
Personnel

The job was kept rolling in spite of the adverse weather by a staff including superintendent Kenneth Rowe and foremen Jim Brown, Del Burns, and Don Jones. The projects were supervised for the Wyoming State Highway Department by resident engineer A. L. Putnam. The chief engineer of the Wyoming department is J. R. Bromley. THE END

A Hough Model HM Payloader dumps sand into the weigh hopper of the Ross Porta-Plant supplying bridge concrete. Cement is weighed in the hopper beside the silo. Transit mixers load in the shelter of the building.

For more facts, circle No. 303→

Precast facing panels have exposed aggregate



A Quick-Way crane, traveling on steel I-beam rails along the roof of the new Denver Hilton Hotel, is used to raise panels into place for the building. Panels, with exposed aggregate, resemble marble. Shoring has been left in place to support the crane load.

Cranes on roof of Denver Hilton place marblelike exterior panels

Precast Mo-Sai stone panels—concrete panels with exposed aggregate facing—make up the entire exterior of the beautiful new Denver Hilton Hotel building in downtown Denver. On the inside, polished precast panels, which resemble marble, encase the columns on the lobby floor of the elaborate $17 million structure.

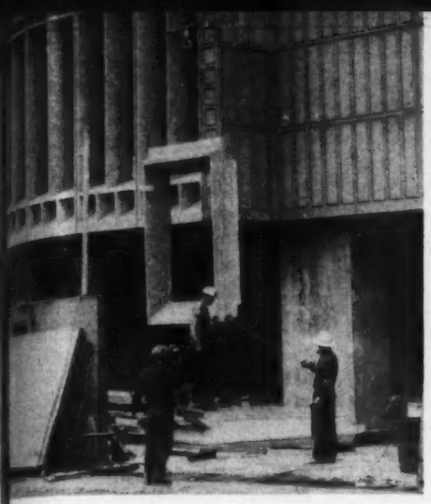
To raise and set the exterior panels, which weigh an average of 3,800 pounds each, the general contractor, Webb & Knapp Construction Corp., Denver, used two small skid-mounted Quick-Way cranes set on the roof.

The brown-colored sand and stone obtained from the building excavation were put through a crushing plant and shipped from Denver to the plant of Otto Buehner & Co. in Salt Lake City to be processed into the precast exterior panels for the building. Additional aggregate was obtained from a pit near Denver.

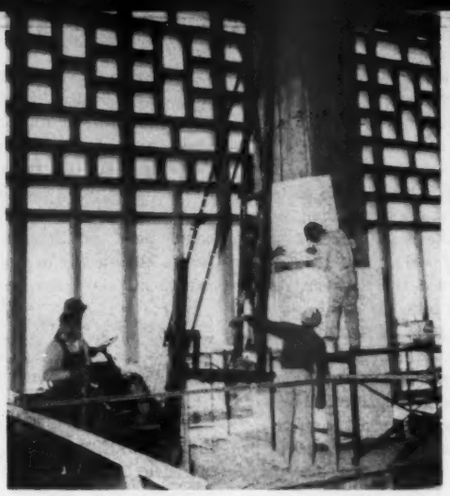
At the Buehner plant, skilled craftsmen, who are truly artists, placed the aggregates that form the exterior surfaces of the panels. These aggregates are arranged on vibrating tables and backed up with a high-strength, very dense concrete mix reinforced with welded-wire fabric. The panels are then steam-cured to attain compressive strengths in excessive of 5,000 psi.

These units were shipped back to Denver by rail and truck to be attached to the exterior of the building frame.

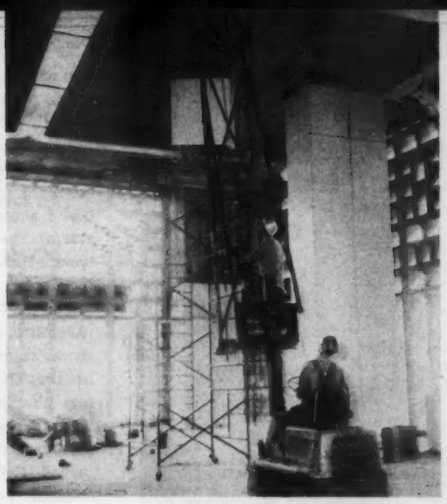
On flat exterior walls, where there were no window openings, flat skin panels were bolted directly to the concrete building frame. Most of these panels are a full floor high and average 8 feet in width. They are 3



Window panels are also of Mo-Sai stone. One is being raised; one man uses a phone system to give hoisting directions to the crane operator.



Precast units, set around columns, are handled by a Hyster fork-lift with special tower attached to the lifting arms. Fingers at the bottom are for low lifts.



The Hyster raises a panel to the scaffold. Next, the tower attachment will be lowered, the section picked up by the small fork at the top and lifted into place.

inches thick and weigh an average of 3,800 pounds each.

Where wondow openings occurred, the panels were designed to receive the metal window frames. These panels are also a full story high. They average 8 feet wide, are 2 feet thick, and weigh approximately the same as the solid skin panels. The window panels are attached to angles on each of the typical hotel floors.

Intricate patterns of openings in the panels of the lower floors provide a striking exterior appearance. Many of these concrete panels are suspended from the structural frame of the building on ¾ by 6-inch steel straps that fit between the precast panels.

Raise cranes to roof

The double material tower, which served throughout the construction of the building for hoisting concrete, steel, and other materials, took the first of the two cranes to the roof. This Quick-Way ½-yard crane was partially dismantled, and the sections were hoisted from the street level to the roof by the Chicago boom of the tower. When this crane was reassembled on the roof, it raised the second crane to the roof in two lifts.

Mounted on steel skids, the two cranes worked their way around the edges of the building, raising the precast panels from the ground to their permanent locations in the walls. The crane operators worked almost entirely by signals telephoned to them by signalmen, who were stationed on the ground and on the swinging scaffolds at locations where the panels were being placed.

A Lorain 25-ton motor crane picked the panels from the trucks as they were deliverd to the site and stockpiled them to await erection. On one low wing of the structure, a P&H 655-B crawler crane placed the exterior panels.

(Continued on next page)

Using two extra sections of boom, the small Quick-Way crane works from a fourth-floor setback to place precast window wall sections for upper floors.

(*Continued from preceding page*)

Encase interior columns

In the lobby area, the big structural-concrete columns of the building frame were encased with special terrazzolike precast units. These beautiful polished panels, also made by Otto Buehner Co., give the appearance of polished marble.

To attach these units securely to the columns, crew members shot rows of threaded steel studs into the columns with powder-actuated tools. The men doing this work used Remington 32-caliber and Ammo 38-caliber tools with Remington N-52 ⅜-inch studs.

Setting these covers for the 25-foot-high columns in the lobby created a hoisting problem. The units were too heavy to handle by hand, yet it was out of the question to get any kind of crane into the limited working areas inside the building. The solution was provided by a small fork truck with a special tower attachment capable of reaching all the way to the ceiling.

A light structural-steel tower about 15 feet high was attached to the lifting arms of the small Hyster fork truck. This attachment had a pair of lifting fingers at the bottom for handling low lifts and another pair near the top for the high lifts. In addition, it had a lifting cable reeved over a sheave at the top of the tower and another sheave attached to the truck. Raising the tower with the fork hoist moved the hook on this line in a 3 to 1 ratio.

For lifts of 15 to 18 feet, the fork truck raised the panels with the hoisting line and maneuvered them into place. Workmen on Time-saver scaffold platforms made the precise adjustments of the panels and attached them to the studs in the columns.

When the lifts exceeded the reach of the cable, a secondary step was included. Using the lifting line, the Hyster fork truck lifted the sections to a platform on a scaffold tower about 15 feet high. The line was then disengaged, and the truck picked up the section with the fork fingers located near the top of the tower. It could then continue to raise the panels all the way to the ceiling for placement.

Personnel

The supervisory staff for Webb & Knapp Construction Corp. was headed by project manager T. J. Smith and included assistant project manager J. E. Smith, general superintendent G. Ellery Lapham, assistant superintendent Walter Pratt, and project engineer R. T. Schraeder.

THE END

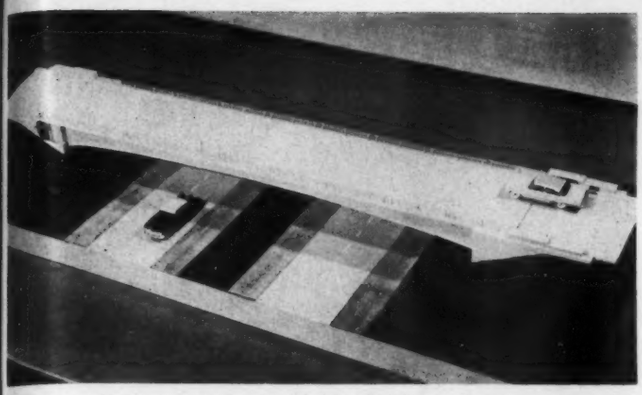
Using an Ammo 38-caliber stud gun, a workman sets Remington N-52 ⅜-inch studs in the concrete columns.

A-C International buys Italian tractor firm

■ Allis-Chalmers International, Milwaukee, has purchased an Italian firm that manufactures crawler tractors and spare parts. Allis-Chalmers Italiana, S. p. A., a subsidiary, acquired the factory and business of Vender, S. p. A., in Cusano, a suburb of Milan. Giuseppe Vender will be managing director of Allis-Chalmers Italiana.

Goodyear appoints

■ William G. Burket has been appointed chief engineer of truck-tire design for The Goodyear Tire & Rubber Co., Akron, Ohio. He replaces J. E. McCarty, who has retired.



Beesing's entry is a welded steel-girder single-span structure that bridges a 4-lane highway. The combination of carbon and high-strength steels and design innovations permits the abutments to be moved back from shoulders and eliminates need for a center pier.

Allan M. Beesing, winner of the top professional award in the Steel Highway Bridge Design Competition sponsored by the American Bridge Division, U. S. Steel Corp., Pittsburgh.

American Bridge names design-contest winners

■ Allan M. Beesing is the top winner in the professional classification of the $44,000 Steel Highway Bridge Design Competition sponsored by the American Bridge Division, U. S. Steel Corp., Pittsburgh. The competition was under the auspices of the American Institute of Steel Construction.

Beesing was awarded $15,000 for his entry, which is a welded-steel-girder structure that bridges, in a single span, a 4-lane divided highway. The combination of carbon and high-strength steels and design innovations permits the abutments to be moved back from the shoulders and eliminates the need for a center pier.

First award in the student classification went to a joint entry submitted by Niels Gimsing and Hans Nyvold of Copenhagen, Denmark. Both are students at the Technical University of Denmark, and they will share $4,000 for their entry of a welded 2-span frame bridge designed for mass production and requiring minimum field erection. Construction work is reduced to a few riveted or bolted connections.

Entrants were required to design a steel bridge to carry a 2-lane crossroad over a modern 4-lane highway. The competition was open to professional design engineers and college engineering students anywhere in the world. Winning entries were selected on the basis of originality of design, utilization of the properties of steel, economy, and appearance.

Corps presents award to Johnson Construction

■ The Al Johnson Construction Co., Minneapolis, has been awarded a certificate of appreciation for distinguished service to the U. S. Army Corps of Engineers in the construction of the Cheatham Power Plant on the Cumberland River near Nashville, Tenn. The citation commends the contractor's management, planning, and staff for the timely completion of the complex structure.

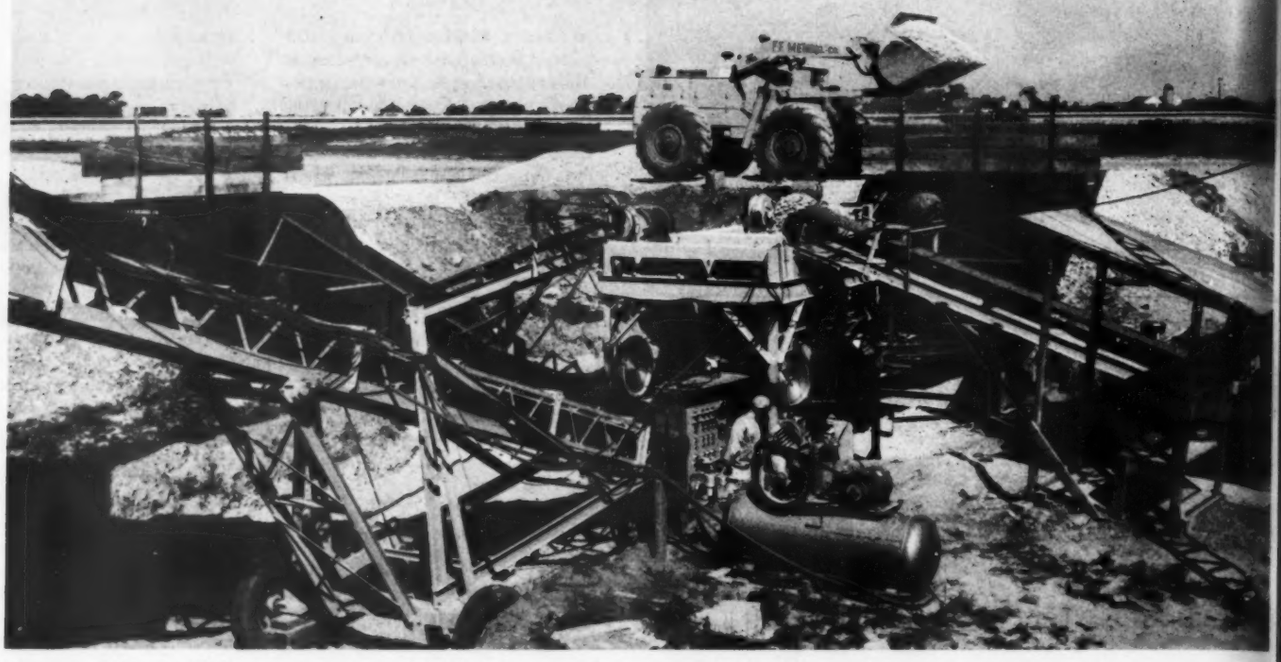
The principal items of work were a 306×108-foot structure containing 22,000 cubic yards of concrete and 2,100,000 pounds of reinforcing steel; installation of machinery and equipment; construction of a switchyard and service road; installation of a microwave radio tower; and removal of a cofferdam.

Blast-hole drilling depicted in Joy film

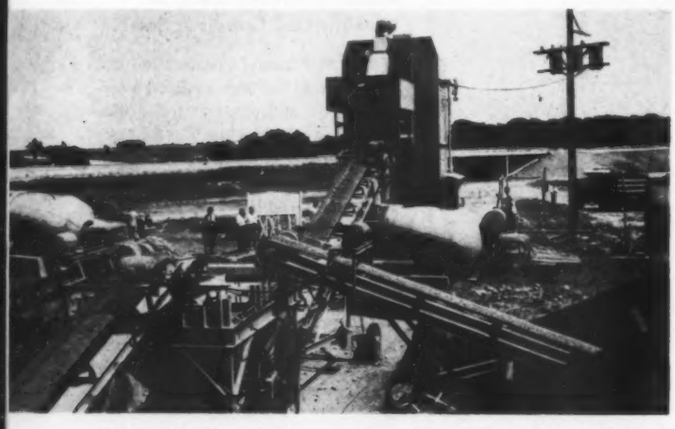
■ "The First Step in Construction," a 16-mm sound and color film released by Joy Mfg. Co., shows blast-hole drilling as the first step in removing large quantities of rock in order to construct buildings, highways, and bridges. Several famous construction jobs are depicted, such as the excavation at the Niagara Power Project, channel deepening on the St. Lawrence Seaway, and the Fort Pitt tunnel in Pittsburgh.

The 15-minute film may be obtained free of charge from Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.

Ready-mix concrete paves interstate route



This is the ready-mix batching setup for paving on Interstate 94 in Wisconsin. Between truck arrivals, a Michigan 175A loads material from small stockpiles, that hold a maximum of 500 yards, to the three 40-yard bins. Short conveyors carry the material to a central batcher that weighs out aggregate and sand. The 3-yard batches go by conveyor, foreground, to the transit mixers. An Ingersoll-Rand compressor supplies the plant's air controls.



Mixed material goes by conveyor from the batcher to a funnel that leads to a waiting transit-mix truck. Cement drops from the weigh hopper of the Rex 485-barrel-capacity plant, and water is added at the same time.

Unusual dry-batch plant and concrete spreader provide advantages for paving contractor

by BILL ALLEN, field editor

Can ready-mix concrete compete with dry-batching methods on a big highway paving job?

"Yes," says Bill Mengel, vice president of F. F. Mengel Co., Inc., Wisconsin Rapids, Wis. "From a money standpoint, we believe that we can compete with either dry-batching or central-mix plants. By using transit mixers, we also have the advantage of versatility. We can do either city paving or highway work."

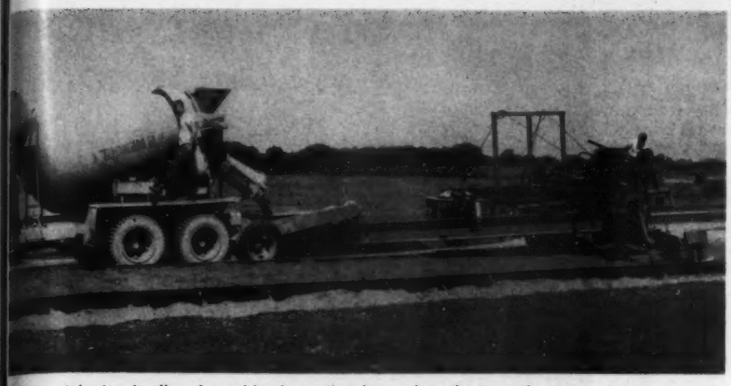
Bill Mengel backed up his claim with a well run paving operation on Interstate 94 in Wisconsin. The route runs between Chicago and Milwaukee, paralleling old U. S. 41.

An effective and unusual plant set-up supplied batches to the transit-mix trucks. Built by Chain Belt Co. ac-

The plant is operated at this control panel. A Mark X meter in the lower left-hand corner adjusts the amount of sand and water per batch. The Motorola radio allows the operator to talk to the paving train.

The two 5-gallon tanks for a spray device for a transit mixer are filled. Five gallons washes in dry aggregate; 5 gallons washes concrete from the blades. Water is cut 10 gallons to compensate for the spray.

The Sputnik, a contractor-made rig, brings concrete to the forms. The material is chuted to a 30-inch conveyor belt supported by a steel channel member. The long arm, supported by cables and pushed back and forth on a radial track by a hydraulic ram, deposits the mix across the 12-foot lane. The rig, powered by a Dodge engine with torque converter, pushes the Rex mixer ahead.



A hydraulically released hook couples the truck to the Sputnik. A screed riding on steel shoes on the rails levels the concrete. An Onan 25-kw generator at the rear of the Sputnik powers the electric motor on the conveyor and the motor for the hydraulic pump. All the controls are handled by the operator.

Working just behind the Sputnik, a workman inserts tie bars in the concrete. The bars are bent on a right angle, with half the bar enclosed in a sheet-metal angle. When forms are removed, the enclosed half will be bent outward to form the tie with the adjoining 12-foot slab.

...rding to Bill Mengel's design, the ...ant features a minimum of aggre... handling. There are no big stock-...iles. Most of the material is dumped ...y trucks directly into large receiving ...ins. It is then carried by belt con...yors to an automatic batcher. With ...is modern automatic plant, the con...ractor is able to batch low-cost con...rete at the rate of about 220 cubic ...ards per hour.

Unique spreader

Another machine of Mengel's design ...akes the concrete from the transit-...ix trucks, spreads it between the ...orms, and screeds the surface. The ...oncrete is carried by a belt conveyor ...hat swings in an arc over the road-...ed.

Because of state spex concerning ...eady-mix concrete, only one lane of ...oadway (12 feet under this contract) ...ould be built at one time. In some ...ays, this was an advantage. By using ...he other half of the road, transit-...ix trucks always had a good surface ...o ride on. There was no center-line ...oint to form or cut. Equipment in the ...aving train was lighter in weight, ...ausing less deformation of the form ...ails and giving a smoother riding ...urface.

Of course, there were disadvan...ages, too. It took two complete passes ...o complete a roadway, and an addi...ional line of rails had to be set.

Boom on Interstate

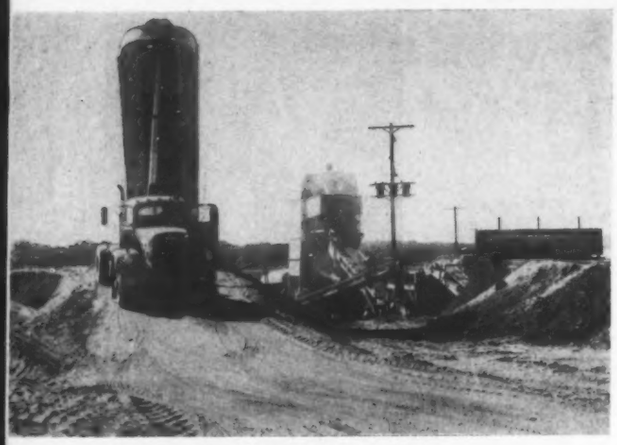
Mengel was one of many contrac...ors at work on 24 miles of Interstate ...4 in Wisconsin so that the entire ...tretch could be opened for traffic by ...ate fall.

Mengel worked on two adjoining ...ontracts totaling $1.75 million. The ...ontracts were primarily for the pav...ng of 10.8 miles of 4-lane divided ...ighway. Mengel bid 179,000 square ...ards of 10-inch concrete for $3.98 ...er square yard. An additional 114,-...00 square yards was bid at $3.75 per ...ard. The wire mesh was bid as a ...eparate item for 54 cents per square ...ard.

From truck to bin

The portable batch plant was set ...p in an interchange area adjoining ...he contract. The contractor took ad...antage of the natural slope of the

(*Continued on next page*)



Aggregate rehandling is held to a minimum at the setup used to turn out dry batches for the paving of sections of Interstate 94 in Wisconsin. Job manager Bill Mengel designed the plant, which was built by Chain Belt. The Perfection body on the White truck is dumping some 18 tons of sand to a 40-yard bin.

This International 190 truck dumping 1½-inch material into one of the bins has a Hercules welded aluminum body that, side-boarded, carries 10 to 11 cubic yards of material. Truck and body weigh 14,200 pounds. ►

(Continued from preceding page)

ground and placed the three aggregate receiving bins on the higher ground and the cement bin at a lower elevation. This plan allowed the ramps approaching the bins to be kept low. It also permitted good natural drainage.

Two short ramps approached each of the three 40-yard-capacity steel bins. Normally, trucks carrying either washed stone or sand backed up the ramps and dumped their loads directly into the bins.

To take up the slack between truckloads, some 500 cubic yards of material was kept on hand near the bins. A Michigan 175A loader shuttled the material from the stockpiles to the bins.

The material dropped from each bin to a short inclined belt conveyor that carried it to a separate weigh hopper. The aggregate batch was then carried by a belt conveyor to a funnel and dropped into the transit-mix truck.

Cement and water also entered the transit mixer at this point. The cement dropped from the weigh hopper of a Rex plant with a 485-barrel capacity and a ground silo of 600-barrel capacity.

One man controls plant

The automatic controls of the plant were set up to discharge two 3-yard aggregate batches and 6 yards of cement, plus water, to the transit mixer. One man at the control panel operated the entire plant. The only other men at the plant were the loader operator and a truck foreman.

The per cent of moisture of the sand in the bin was continuously measured by an electronic device to assure a uniform quality for the mix. Manufactured by Sarasota Engineering Co., Sarasota, Fla., the Mark X H_2O meter gives a continuous reading of the moisture percentage. When the moisture changed appreciably, the control-panel operator adjusted the quantities of sand and water in the mix to compensate for the change.

Also at the control panel was a Motorola 2-way radio that allowed

Three generations of Mengels are on this job; Forest F. Mengel, president of the company, left; William F. Mengel, vice president and manager; and William C. Mengel, 16, who's getting a start in construction by working with his father and grandfather on this job.

the plant operator to talk directly with the paving train. The unit on the road was mounted on the transverse finisher. The contractor, superintendent, and foremen also had radios in their cars and pickups.

Truck traffic at times got heavy around the plant. During the working day, some 20 tandem-axle dump trucks rolled up to the receiving bins per hour, and up to 24 cement trucks unloaded during the day at the plant. Although the gravel and sand was produced some 25 miles away, the contractor did not find it difficult to schedule the loads to keep the bins full. And, of course, the front-end loader filled in when a bin got low.

Although the plant has a capacity of 220 cubic yards per hour, Mengel normally operated at about 150. On the road, this yielded about 4,000 feet of 12-foot-wide pavement per day. Some 75 men contributed to the production, not counting the drivers hauling aggregate.

As many as eleven transit-mix trucks hurried the concrete from the plant to the paving spread. The Rex mixers mounted on International trucks added six cubic yards to the pavement on each trip. The mixers were rotated by a power takeoff from the truck engine.

Paving train

The transit mixers chuted their loads to the special spreader that distributed the concrete on the roadway and screeded it to the desired depth. The spreader was followed by a Blaw-Knox transverse finisher, a Rex combination finisher and pan float, and a Rex spray machine.

Tie bars were set in the fresh concrete by hand by means of a right-angle bar. The half of the bar against the form was sheathed in a metal angle. When the forms were removed, this half of the bar was bent upward.

Special spreader

Mengel's spreader made possible a float discharge of the truck mixers, an even distribution of concrete on the subgrade, and a leveling of the mix in one operation. The rig, patented by Mengel, has a long, steel-framed body on a tandem axle at the rear and two hydraulically controlled steering wheels at the front. The tandem wheels are powered by a Dodge gasoline engine with torque converter.

The rig actually pushed the transit-mix truck ahead of it. A hydraulically released hook coupled the truck to the rig. Concrete was chuted straight back and down to a 30-inch belt that carried the material to the roadbed. To distribute the concrete evenly between the forms, the belt is pivoted at the front, and the discharge end is supported from a carriage that rolls on a radial track. A hydraulic ram pushes the carriage back and forth. A screed, riding on steel shoes on the rails, levels the concrete. The screed can be hydraulically raised or lowered to smooth either the first or second lift.

Mounted at the rear of the machine is an Onan 25-kw generator. The unit supplies current for the 10-hp electric motor on the conveyor and the 10-hp motor that runs the hydraulic pump. One operator, seated at the rear, handles all the controls.

Spray device on mixers

Another idea, for which Mengel has a patent pending, is a spray device for washing the drum of transit mixers. All the trucks on the job were equipped with the automatic sprayer.

A spray nozzle mounted inside the mixer accomplishes two things. It washes in the dry cement and gravel immediately after the mixer has received its load and washes the concrete from the blades after the mixer has discharged.

Each spraying required exactly 5 gallons of water. The total of 10 gallons was subtracted from the planned

(Continued from preceding page)

quantity of water in the six cubic yards. The pump and tank unit was mounted on the rear fender of the truck. The driver filled the two 5-gallon tanks as his truck picked up the load at the plant. The truck driver started the spray from the cab as soon as he left the plant. He pushed a button and 5 gallons of water was pumped into the rear of the mixing drum as he was going to the dump site. As soon as the load was discharged, he pushed the button again, and another 5 gallons was pumped into the rear of the mixer as the truck returned to the plant.

The object of the device is to keep the mixer clean so that it will function properly, save time, and, most important of all, assure Mengel's men and the inspection men of the exact amount of water in each load.

Bill Mengel, who managed the job, invents equipment in his spare time. He is a registered professional engineer with a degree from the University of Notre Dame. His son, Bill, who is 16, broke in on this job. His father, Forest F. Mengel, runs the growing construction company. Don Klement was the general superintendent, and Ken Rubey was equipment superintendent.

Douglas E. Small, also a graduate engineer, supervised the construction for the Wisconsin State Highway Commission. Clarence Fifield was the finishing inspector and Roland Pentica the materials inspector for the state. THE END

Cornerstone is laid for Goodyear plant in France

■ Amiens, France, is the site of a new tire and tube manufacturing plant of Goodyear Tire & Rubber Co., Akron, Ohio. A microfilm of a goodwill message inscribed in rubber, from the people of Akron to the people of Amiens, was inserted in the cornerstone, which was shipped to France for the cornerstone-laying ceremony last month.

Massey-Ferguson news

■ John Vilven has been named general sales manager for Massey-Ferguson Industrial Division, Wichita, Kans. He will head the division's over-all sales efforts.

Convention Calendar

December 13-14 The Material Handling Institute
Annual Meeting, Savoy-Hilton Hotel, New York, N. Y. L. West Shea, managing director, Hanson & Shea, Inc., One Gateway Center, Pittsburgh 22, Pa.

January 11-15, 1960, Highway Research Board
Annual Meeting, Sheraton Park Hotel, Washington, D. C. Fred Burggraf, director, HRB, 2101 Constitution Ave., Washington 25, D. C.

January 18-21 American Road Builders' Association
Annual Meeting, Netherland Hilton Hotel, Cincinnati, Ohio. Norman T. Almquist, administrative services manager, ARBA, 600 World Center Bldg., Washington 6, D. C.

January 19-21 National Limestone Institute
Meeting, Statler-Hilton Hotel, Washington, D. C. Robert M. Koch, NLI, 1015 12th St. N.W., Washington, D. C.

January 24-28 Associated Equipment Distributors
Annual Convention, Conrad Hilton Hotel, Chicago, Ill. W. G. Bowman, executive secretary, AED, 30 E. Cedar St., Chicago 11, Ill.

January 25-27 Association of Asphalt Paving Technologists
Meeting, Hotel Peabody, Memphis, Tenn. Ward K. Parr, secretary-treasurer, AAPT, Box 619, 1224 E. Engineering Bldg., University of Michigan, Ann Arbor, Mich.

January 25-28 Plant Maintenance and Engineering
Show and Conference, Convention Hall, Philadelphia, Pa. Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

January 27 The Moles
Annual Award Dinner, Waldorf-Astoria Hotel, New York, N. Y. Mrs. Marguerite McLean, headquarters secretary, The Biltmore, Madison Ave. at 43rd St., New York 17, N. Y.

January 27-29 New York State County Highway Superintendents Association
Winter Meeting, DeWitt Clinton Hotel, Albany, N. Y. Harry R. Mason, secretary, NYSCHSA, Fonda, N. Y.

February 1-4 National Bituminous Concrete Association
Fifth Annual Meeting, Sheraton-Cadillac Hotel, Detroit, Mich. H. K. Griffith, executive director, NBCA, 1145 19th St. N.W., Suite 218, Washington 6, D. C.

February 15-19 National Sand and Gravel Association and National Ready Mixed Concrete Association
Forty-fourth NSGA Annual Convention, Thirtieth NRMCA Annual Convention, Biennial Show, Conrad Hilton Hotel and Chicago Coliseum, Chicago, Ill. V. P. Ahearn, executive secretary, NSGA-NRMCA, 1325 E. St. N.W., Washington 4, D. C.

February 22-24 National Crushed Stone Association
Forty-third Annual Convention and Manufacturers Division Exposition, Conrad Hilton Hotel, Chicago, Ill. J. R. Boyd, executive director, NCSA, 1415 Elliot Place N.W., Washington 7, D. C.

February 22-25 Weed Society of America
Meeting, Cosmopolitan Hotel, Denver, Colo. Richard Fosse, chairman of local arrangements, WSA, Am-Chem Products, Niles, Calif.

February 25-26 Highway Engineering Conference of the University of Colorado
Thirty-third Annual Conference, University Memorial Center, Boulder, Colo. Roderick L. Downing, director, HECUC, 207 Engineering Bldg. No. 1, University of Colorado, Boulder, Colo.

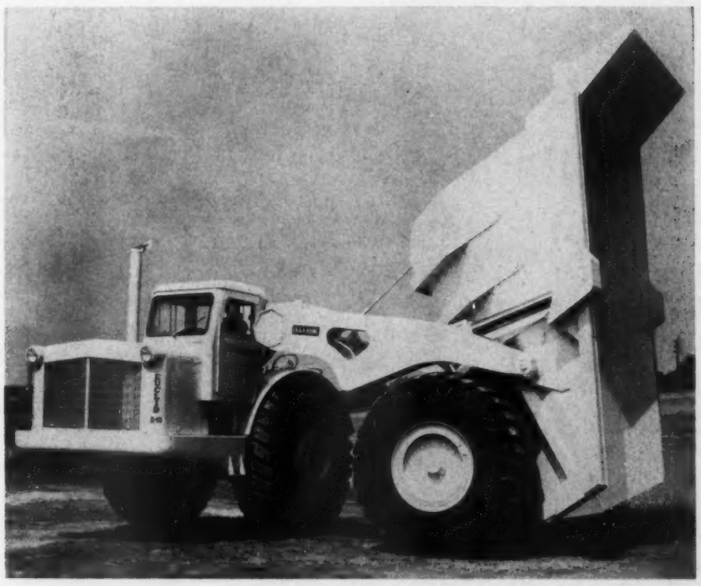
U. S. Steel appoints

■ R. W. Hyde and Francis M. Goodwin, Jr., have been appointed vice presidents and assistant treasurers of U. S. Steel Corp., Pittsburgh. Charles H. Kraft has been named assistant treasurer of the corporation.

PRODUCT PARADE

For further information on any of the products described in the following section, circle the designated number on the Request Card at page 18.

Hauler has variable wheelbase



The Euclid Division of General Motors announces the addition of a new variable wheelbase machine to its line of off-highway rear dump haulers. Designated Model S-18, the unit consists of an overhung engine-type tractor with an Easton-built semitrailer.

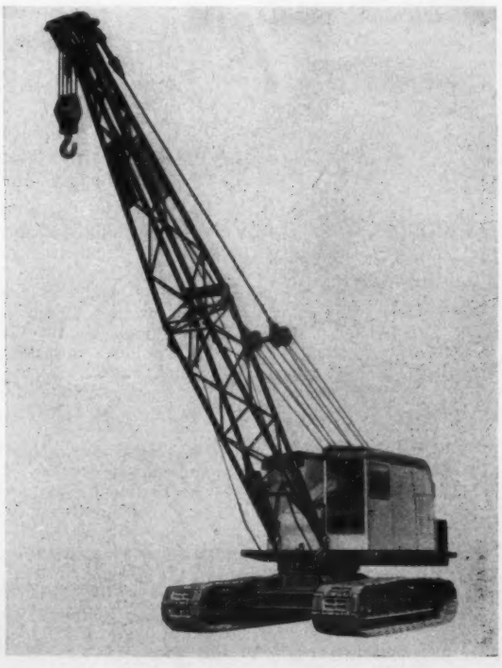
The S-18 tractor is powered by a GM 6-110 engine of 336 horsepower. Top travel speed with full payload is 25 mph.

Full hydraulic steering enables the tractor to make full 90-degree turns. The complete machine makes a non-stop turn in 34 feet when in hauling position. With the hopper raised, turning width is only 28 feet 8 inches.

Wheelbase of the S-18 rear dump is 20 feet in hauling position; with body raised to dumping position, the wheelbase is shortened to 13 feet 6 inches. Weights are 67,000 pounds net, 137,000 pounds gross.

The Easton Model TS 2635 trailer has a struck capacity of 23 cubic yards.

For further information write to the Euclid Division, General Motors Corp., Dept. C&E, 1361 Chardon Road, Cleveland 17, Ohio, or use the Request Card at page 18. Circle No. 35.



Announce 40-ton crane in 1¼-yard class

The Thew Shovel Co. offers a new 40-ton crane in the 1¼-yard class. Designated Model 56, the unit is mounted on a 14-foot-long, 13-foot-wide crawler, and handles up to 110 feet of boom.

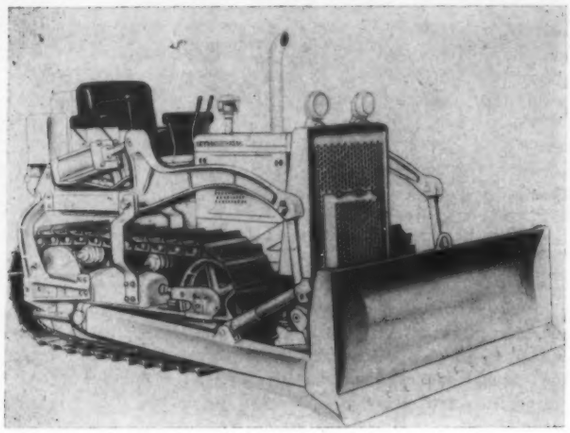
"Joy-stick" air power controls are a major feature of the machine. Using just two levers, the operator controls single or combined operations of all turntable clutches with metered air power, yet retains the normal feel of the machine for smooth, responsive control. The crawler is also air-controlled.

A torque converter multiplies engine torque automatically as digging conditions require. The engine cannot stall under any digging circumstances. The converter relieves engine, mechanism, and cables of digging impacts and stresses.

The Lorain 56 also incorporates wide use of anti-friction bearings in such important places as the travel shaft, hoist, and swing drums.

The rear counterweight is easily detached for weight reduction in highway transport. The new machine is convertible to dragline, clamshell, crane, or hoe.

Write to The Thew Shovel Co., Dept. C&E, 28th and Fulton Road, Lorain, Ohio, or use the Request Card at page 18. Circle No. 105.



The new International TD-9 crawler features the International D-282 turbocharged engine delivering 66 horsepower.

Crawler tractors feature 6-cylinder engines

New International TD-9 and TD-6 crawler tractors, featuring 6-cylinder direct-starting diesel engines and new track rollers providing 500-hour lubrication intervals, are announced by the Construction Equipment Division of the International Harvester Co.

Both machines are designed to be fitted with a wide variety of dozers, loaders, and other equipment for handling all types of earthmoving and material-handling jobs.

Both the TD-9 and the TD-6 are powered by the new International D-282 diesel engine. The turbocharged engine of the TD-9 delivers 66 horsepower, while the naturally aspirated engine of the TD-6 develops 52 horsepower.

Operating weight of the TD-9, with 60-inch gage, is 11,430 pounds. It pulls 11,720 pounds at 1,700 rpm. The tractor is available with a 4-roller track frame and has five forward speeds and one reverse.

The TD-6 has an operating weight with 50-inch gage, of 8,665 pounds, and it pulls 8,715 pounds at 1,700 rpm. This unit also is available with 4 or 5-roller track frames and has five forward speeds and one reverse.

For further information write to the Construction Equipment Division, International Harvester Co., Dept. C&E, 180 N. Michigan Ave., Chicago 1, Ill., or use the Request Card at page 18. Circle No. 93.

Direct-current welders are diesel-engine-driven

Welding voltage is adjusted automatically during use of new 300 and 400-amp dc diesel-engine-driven welders offered by the Welding Products Division of A. O. Smith Corp.

Only two indicators have to be set to operate either unit: one for electrode size, the other for current.

Welding range of the 300-amp machine, Model A3000 W-DS, is 60-amp minimum at 20 volts and 375 maximum amp at 40 volts. For the 400-amp Model A4000 W-DS, welding range is 80 amp at 20 volts and 500 maximum amp at 40 volts. Maximum open-circuit voltage is 80.

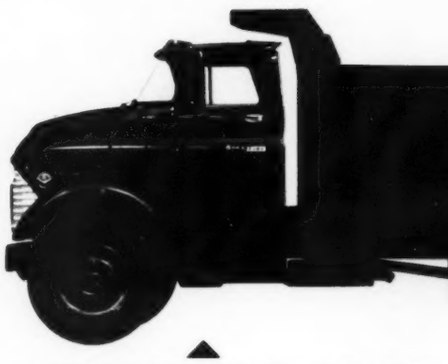
Both units are powered by Continental liquid-cooled engines.

An outlet is provided for the operation of universal tools and floodlights. Output is 2 kw, 80 volts dc.

For further information write to the A. O. Smith Corp., Welding Products Division, Dept. C&E, 3533 W. 27th St., Milwaukee, Wis., or use the Request Card at page 18. Circle No. 48.

FROM OPERATION

"HIGH GEAR" THE INDUSTRY'S GREATEST DESIGN, ENGINEERING AND QUALITY-CONTROL PROGRAM THE M



This new B4000 Ninety-Incher is ideal for dump body, flat-bed or other construction hauling. Available with 150, 165 or 180 hp. V-6 engine. GVW to 23,000 lbs.

Biggest GMC Truck ever built—up to 120,000 lbs. GCW. BW9000 Series with 90" BBC offers contractors choice of Twin-Six gasoline or V-6 diesel power.

NEW CONVENTIONAL NINETY-INCHERS! This is the industry's first and only complete line of conventional-type Ninety-Inchers—19,500 lbs. GVW to the new giant-size 120,000 lbs. GCW. BBC is only 90". Front axle loading is ideal. Powered by four completely new V-6s, the revolutionary Twin-Six or modern V-6 diesels. Specially-reinforced double-life cabs. New easy-to-service four and six-wheel "Cost-Busters" for every construction haul.

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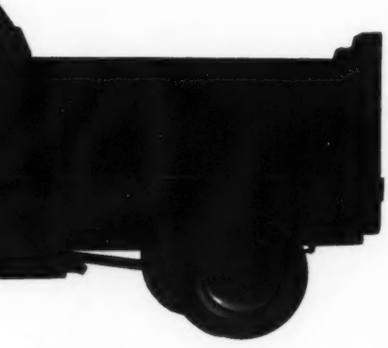

mp body, flat-bed
h 150, 165 or 180

New, roomy Custom Suburban carries 8-man crew or hauls bulky loads. Four-wheel drive model makes its own road to any job site regardless of terrain or weather.

CW. BW9000
n-Six gasoline

This is the rugged, new GMC Custom ½-ton pickup with 8-foot Wide-Side body. Choice of 34 pickup combinations to meet every construction use.

st and only
s. GVW to
axle loading
ry Twin-Six
New easy-to-
on haul.

NEW CONVENTIONALS! Announcing the new distinguished Conventional GMCs with bold, practical styling! Completely new, exclusive triple-life V-6 engines with lowest-cost, longest-lasting performance! Bigger, sturdier built cabs! Easiest-handling, smoothest-riding, hardest-working trucks ever built! From the handsome ½-ton pickup to the capable 45,000-lb. GCW tractor, new GMC Conventionals are superior in every way.

SEE THE

MOST ADVANCED CONSTRUCTION TRU

-bed
180

New, roomy Custom Suburban carries 8-man crew or hauls bulky loads. Four-wheel drive model makes its own road to any job site regardless of terrain or weather.

This is the rugged, new GMC Custom ½-ton pickup with 8-foot Wide-Side body. Choice of 34 pickup combinations to meet every construction use.

NEW CONVENTIONALS! Announcing the new distinguished Conventional GMCs with bold, practical styling! Completely new, exclusive triple-life V-6 engines with lowest-cost, longest-lasting performance! Bigger, sturdier built cabs! Easiest-handling, smoothest-riding, hardest-working trucks ever built! From the handsome ½-ton pickup to the capable 45,000-lb. GCW tractor, new GMC Conventionals are superior in every way.

SEE THE YEL

N TRUCKS IN 20 YEARS!

New steel tilt-cab six-wheelers have ratings of 37,000–52,000 lbs. GVW . . . 50,000–76,000 lbs. GCW. Versatile LW5500 Series shown in full-tilt position with 7-yard mixer.

-foot
very

NEW TILT-CABS! For the first time—a complete new line of GMC tilt-cabs! 72-inch BBC with 52-inch front axle placement for bigger payloads, both volume and pounds! Powered by responsive, triple-life, high-torque V-6 and Twin-Six gas engines; and compact V-6 diesels! Full tilt completely exposes the engine for quick, easy servicing! Four and six-wheelers—19,500 lbs. GVW to 76,000 lbs. GCW.

PULL

THE YELLOW PAGES FOR YOUR NEARBY GMC TRUCK DEALER

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FROM OPERATION "HIGH GEAR"

THE BIG GMC BREAKTHROUGH

IN TRUCK ENGINE, CHASSIS AND CAB ENGINEERING

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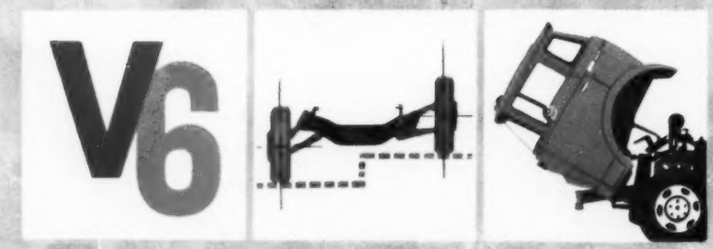

THAT DRASTICALLY CUTS YOUR TRUCKING COSTS

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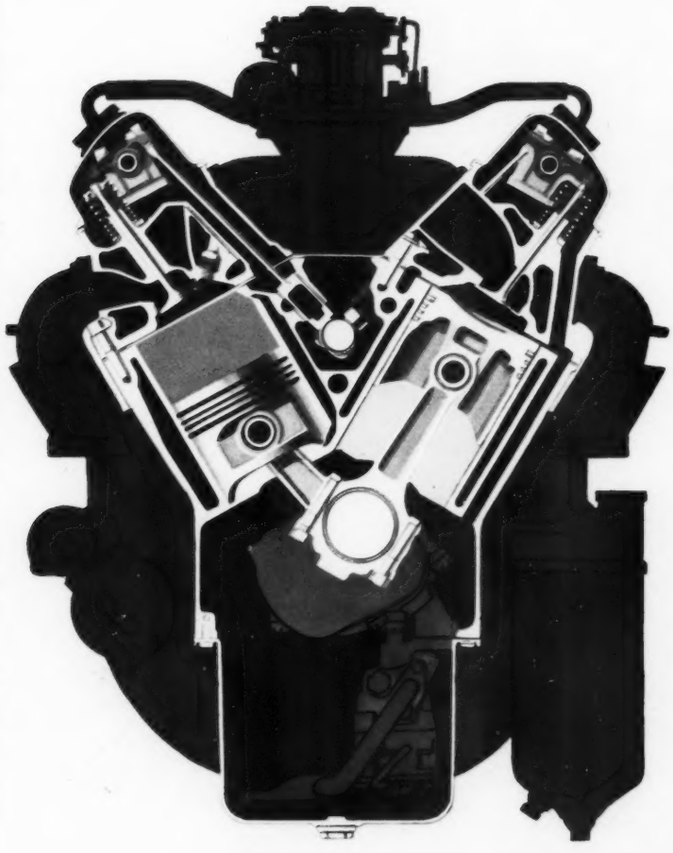
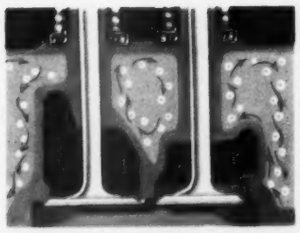
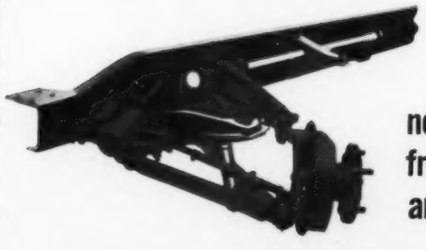
NEWEST, GREATEST ENGINE



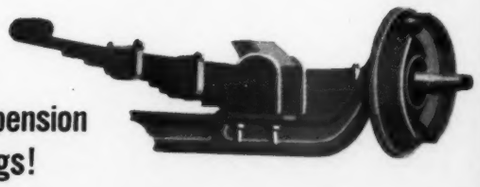


Coolest, Biggest Valves!

New GMC V-6 engines have three times better cooling (up to 176 gallons per minute) than all other comparable engines. Integral valve guides and the widest bridge between valves for the longest, most trouble-free operation. Less heat concentration, too, because no two exhaust valves are adjacent. Largest valves mean more work from every gallon of gasoline!



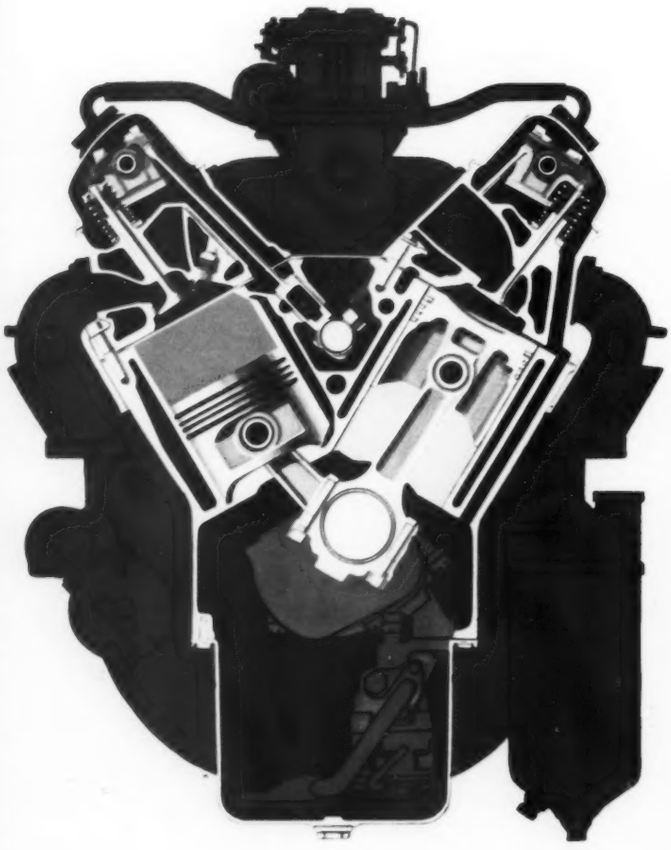
newest front suspension and springs!

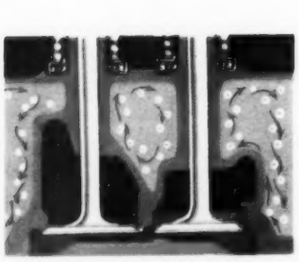


Easier handling, smoother ride and less maintenance are all yours with GMC's new independent front suspension and torsion bar springs. One ride will convince you.

Larger models also have increased stability, shorter turning and improved handling . . . new, longer-lived, stronger I-beam front axles, wider spring centers and wider tread.

NEWEST, GREATEST ENGINE AD





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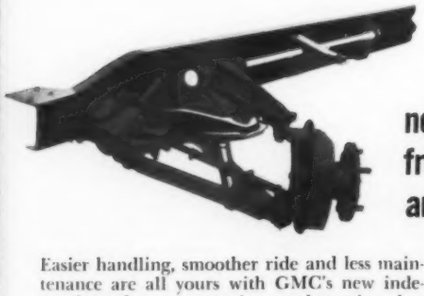
Model
305A
305B
305C
351
401



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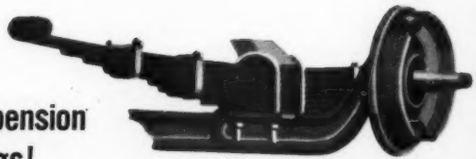

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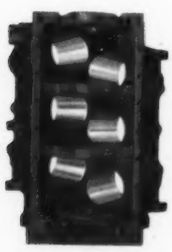
E ADVANCES IN 20 YEARS!

NEW V-6 most modern, most rugged engines built...outlast others up to 3 times longer!

Here is a completely new, more compact, stronger engine with the proved six-cylinder principle that produces full power over a broad range and at lower life-saving engine rpm. Actual tests have proved these new GMC V-6 truck-built engines last up to three times longer than other engines. Just a few of the reasons why are shown here. Ask your GMC Dealer for further factual, visual proof of the superiority of GMC's V-6 engines.

V-6 PERFORMANCE RATINGS		
Model	Max. Horsepower	Max. Torque
305A	150 @ 3600	260 @ 16-2000
305B	150 @ 3600	266 @ 12-1400
305C	165 @ 3800	270 @ 14-1600
351	180 @ 3400	312 @ 18-2000
401	205 @ 3200	377 @ 1400



Strongest, Most Rigid Block!

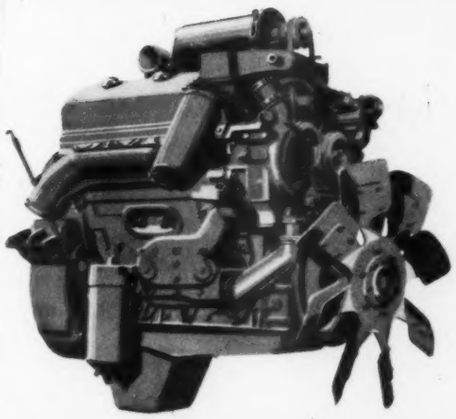
GMC V-6 engines have staggered cylinders, extra-strong inner ribbing—plus full 3-inch drop crankcase skirts to eliminate distortion and deflection . . . add years of life to all components.

NEW GMC TWIN-SIX exclusive design, greatest power!

This new GMC Twin-Six engine has the most pulling power of any standard gas engine! Highest torque over a broader, low rpm engine range reduces shifting as much as 60%. Ample reserve power permits you to maintain tight schedules with higher average speeds.

Notice maximum engine speed is only 2400 rpm! This means less engine strain, higher performance, lower costs and longer life.

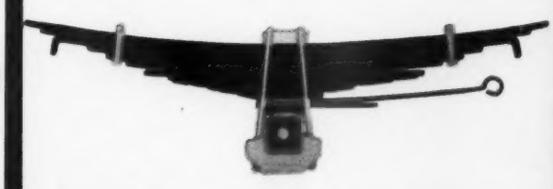
TWIN-SIX PERFORMANCE RATINGS		
Model	Max. Horsepower	Max. Torque
702	275 @ 2400	630 @ 16-1900



bigger brakes for surer stops!

Longer life, too, with increased lining areas. New centrifuse drum with steel outer shell and cast iron braking surface has greater heat transfer.

Steel tilt-cab (shown) also has the biggest windshield, best safety-vision, of any truck.



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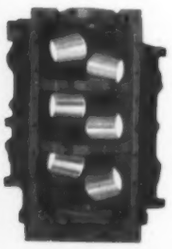

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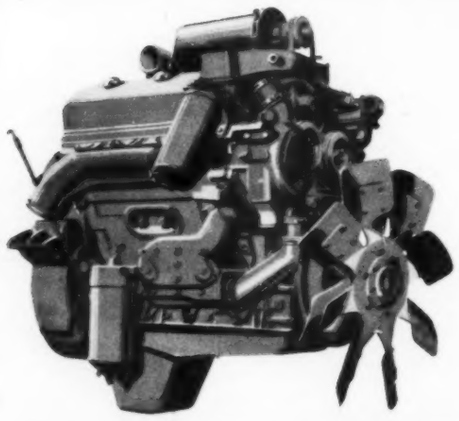

NEW G lightest,

- Up to 53 power di
- Only 42 diesel!
- Two-cycl fuel-savi

With your G complete, c GMC Diese expense.

Model	
6V-71	

*Optional at r

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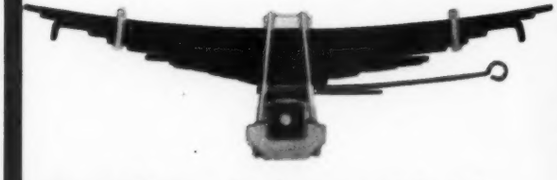

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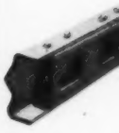

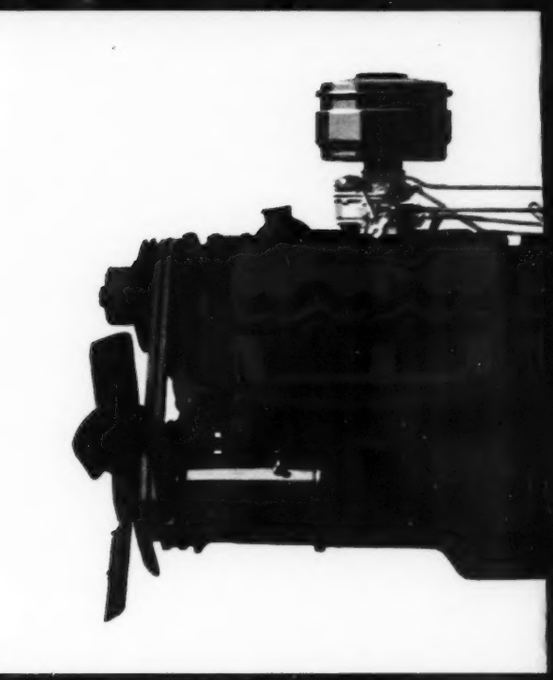

NEW GMC TRUCK V-6 DIESEL

lightest, shortest and most efficient!

- **Up to 530 pounds lighter than comparable horsepower diesel engines!**
- **Only 42 inches long – shortest of any 6-cylinder diesel!**
- **Two-cycle design for best performance and greatest fuel-savings!**

With your GMC diesel engine and truck chassis, you get complete, convenient *one-stop* parts and service at your GMC Diesel Truck Dealer to save costly downtime and expense.

DIESEL PERFORMANCE RATINGS		
Model	Max. Horsepower	Max. Torque
6V-71	189 @ 1800 or 210 @ 2100*	577 @ 1200

*Optional at no extra cost.

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GMC TRUCK AND

20 YEARS!

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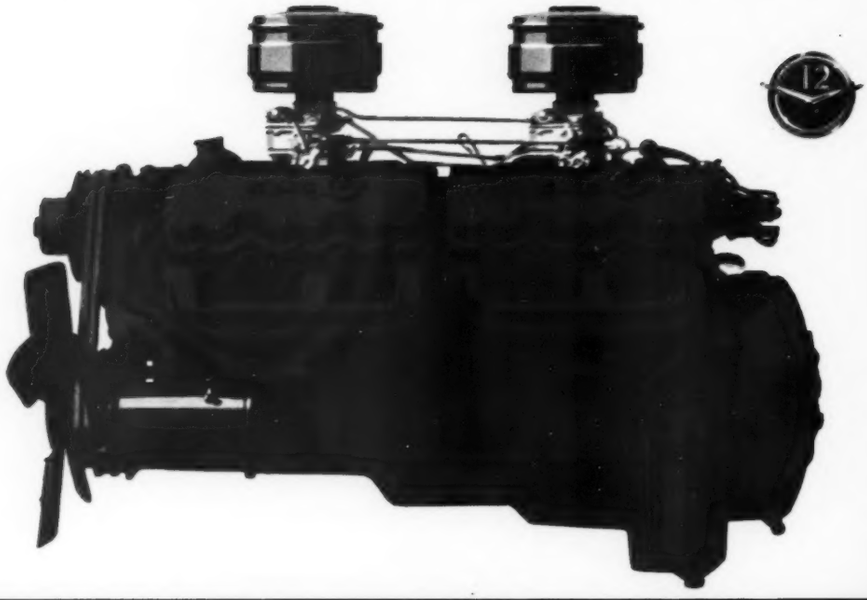

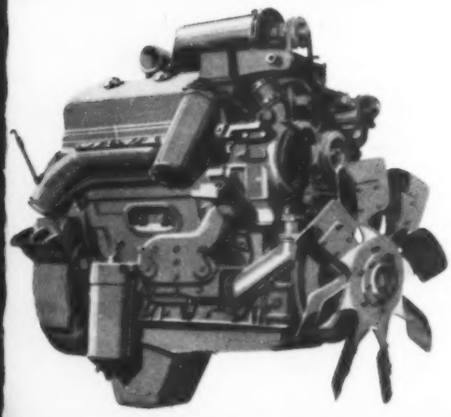

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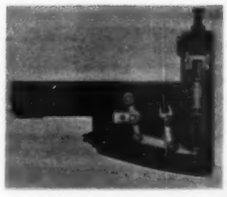

Only GMC Trucks have this economy range governor that positively controls engine speed at most efficient point in top gears for outstanding fuel economy.

Save up to 5% on fuel and increase usable horsepower up to 7% automatically with GMC's exclusive hydraulic fan—standard equipment.

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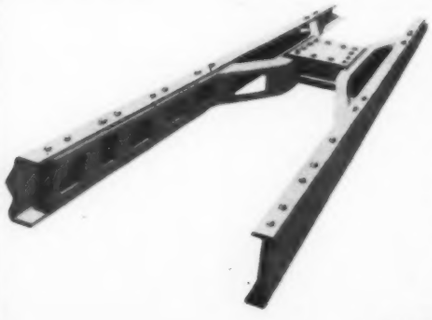


up to 35% stronger frames!

New design frames made of new materials are stronger and lighter to carry bigger loads of aggregate, dirt and cement dependably for years. 5500 Series and up have new, extra-strength SAE950 hi-tensile frames standard. New L-type reinforcements are also stronger.

GMC TRUCKS

From ½-ton to 60-ton
General Motors leads the way!

GMC TRUCK AND COACH—A GENERAL MOTORS DIVISION—PONTIAC, MICHIGAN

new snowplow, the Balderson Model BV14, is now available for the erpillar No. 14 motor grader. Replaceable components include shoes, piece, and cutting edges. The BV14 may be controlled by either scari- or hydraulic controls. Specifications include: front height, 4 feet 3 ; rear height, 7 feet 8 inches; cutting width, 10 feet 6 inches; ex- width, 12 feet; weight 2,730 pounds with double-acting scarifier rol, 2,880 pounds with double-acting hydraulic control. For further rmation write to **Balderson, Inc.,** Dept. C&E, Wamego, Kans., or use Request Card at page 18. Circle No. 58.

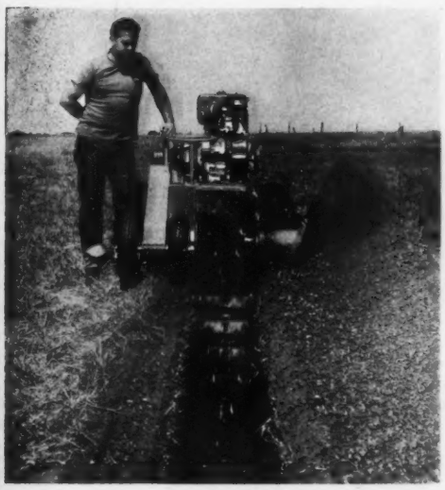
New prestressing systems feature tube anchorage

The International Prestressing Corp. announces the availability of Gifford-Udall prestressing systems. These British-made systems include wire and small strands for either post-tensioning or pretensioning, large strands up through 1⅛-inch diameter for post-tensioning, and tube anchorages for wire or strand.

The tube anchorage consists of a simple integrated assembly of a plate, tube, and helical reinforcement. This single unit is placed in the form with the tendons, mild-steel reinforcement, and other inserts prior to concreting. An anchor plate is used to accept the new special wedges that anchor the wire or strand to the anchorage.

The advantages claimed for the new tube anchorage are: ease of placement, compact size permitting efficient cross sections of concrete, built-in facility for grout injection after stressing, and helical reinforcement to take the bursting stresses directly under the anchorage plate.

For further information write to the International Prestressing Corp., Dept. C&E, 617 N. Imogen Ave,. Los Angeles 26, Calif., or use the Request Card that is bound in at page 18. Circle No. 65.



Designed to cut trenches up to 5 feet deep and 12 inches wide, the Ditch Witch Model M-322 can be used for foundation footings, sewer laterals, water lines to 5-foot cover, and many other applications. The unit is powered by a Wisconsin AGN 12-hp air-cooled engine. For further information write to **The Charles Machine Works, Inc.,** Dept. C&E, 625-30 Birch St., Perry, Okla., or use the Request Card at page 18. Circle No. 41.

This portable single-pass crushing plant, featuring a 15×36-inch jaw crusher, a 3×5-foot 1½-deck vibrating screen, a 30-inch delivery conveyor, and a 2-cubic-yard-capacity loading hopper, is a new offering of the Diamond Iron Works. Designated Model 1536, the plant reportedly is capable of consistently producing 90 to 120 tph based on 25 per cent oversize material passing a 1-inch screen. For further information write to the **Diamond Iron Works,** division of Goodman Mfg. Co., Dept. C&E, 4834 S. Halsted St., Chicago 9, Ill., or use the Request Card at page 18. Circle No. 106.

The all-new cab-forward truck in the foreground, the 1960 Dodge Model CT800, features a 10-cubic-yard Heil body and a maximum gvw of 45,000 pounds. At the right is a Model D600 with a 6-yard Perfection body and a maximum gvw rating of 22,000 pounds. For further information write to the Dodge Division, **Chrysler Corp.,** Dept. C&E, 7900 Jos. Campeau Ave., Detroit 31, Mich., or use the Card at page 18. Circle No. 79.

Cypher portable lubrication rigs can be installed on small pickup, large flat-bed or enclosed van-type trucks.

Portable lubrication rigs feature flexible design

Portable lubrication rigs that can be designed for and installed on small pickup, large flat-bed, or enclosed van-type trucks are offered by The Cypher Co.

Equipment for these rigs may include an air compressor and six air-operated drum pumps—two for high-pressure operations and four for low-pressure jobs. These pumps are attached to either 55-gallon drums or fabricated tanks. A bank of spring-loaded hose reels equipped with 35 feet of flexible hose allows the operator to handle any job outside of the rig.

In most cases, these rigs are equipped to dispense motor oils, gear oils, and light or heavy grease for chassis and track roller lubrication. If so desired, units for gasoline, diesel fuel, water, and air can also be installed in the rig.

For further information write to The Cypher Co., Dept. C&E, 1201 Washington Blvd., Pittsburgh 6, Pa., or use the Request Card at page 18. Circle No. 96.

New tractor series with matched equipment

The Caterpillar Tractor Co. announces the availability of a new series D9 tractor.

Designated D9 Series E, the unit is available in a choice of direct drive or torque-converter drive, as well as the power-shift version. Horsepower has been increased to 335.

Prime improvements in the new D9 tractor are concentrated in the undercarriage. The track group is completely new and is characterized by dimensional increases and strengthening of all components.

Improvements have also been designed into the D9's three models of cable-operated bulldozers. Twelve-inch sheaves, now provided, offer easier spooling and longer cable life. An additional feature of the new blades is the 3-piece cutting edge, which allows for quick reversal or replacement of worn or damaged edges.

For further information write to the Caterpillar Tractor Co., Dept. C&E, Peoria, Ill., or use the Request Card that is bound in at page 18. Circle No. 97.

For more facts, circle No. 319→

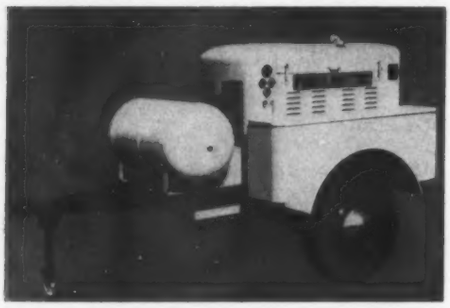
Starting primer permits one-man operation

A starting primer that utilizes an aluminum starting-fluid capsule is available from the Start Pilot Corp. Known as Quick-Primer Model No. 962, the unit can be installed in the cab of the vehicle, near the regular engine starting button, thus permitting one-man operation.

The operator has complete control over the amount of fluid injected into the intake manifold and can discontinue the pumping operation as soon as the engine fires smoothly.

Each capsule reportedly contains between 3 and 5 starts.

For further information write to the Start Pilot Corp., Dept. C&E, 61 Second Ave., Mineola, N. Y., or use the Request Card at page 18. Circle No. 74.



◄General Supply's Porta-Air 75 compressor delivers 75 cfm at 100 psi. The unit features a 13-gallon gas tank.

Lightweight compressor offers 75 cfm at 100 psi

A lightweight compressor called the Porta-Air 75 is offered by the General Supply Co.

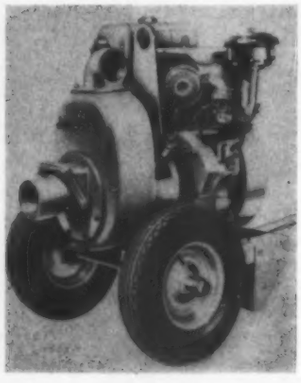
The unit delivers over 75 cfm at 100 psi. Equipped with a heavy-duty Chrysler engine, it consumes only 1½ gallons of gas per hour. A 13-gallon gas tank guarantees all-day operation without refueling.

Other advantages of the new Porta-Air include convenient grouping of all instruments and controls; working parts quickly accessible; eye or ball hitch on trailer models as desired; 12-volt electrical system; and 200-psi air receiver.

For further information write to the General Supply Co., Dept. C&E, 1920 McGee Trafficway, Kansas City, Mo., or use the Request Card at page 18. Circle No. 78.

New pumps feature easy accessibility

The new line of Jaeger 3-inch contractors' pumps are designed to permit quick removal of the entire suction chamber and liner plate without



removing the volute. Adjustment, rotation, or replacement of the liner can be completed in a few minutes, states the company.

Featured is the Model 3PN, which can pump all the water a 3-inch suction hose can handle at a 5-foot lift. With a 4-inch suction hose, it delivers 28,000 gph at a 10-foot lift. Self-priming at a 10-foot lift takes only 15 seconds; requires only 50 seconds at a 25-foot suction lift.

The pump weighs 395 pounds complete with pneumatic-tire truck.

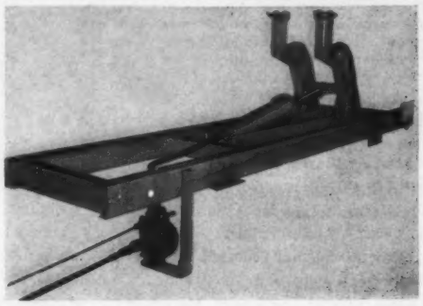
For further information write to The Jaeger Machine Co., Dept. C&E, 550 W. Spring St., Columbus 16, Ohio, or use the Request Card at page 18. Circle No. 38.

Bushed arbor holes for prestress strand reels

A friction-reducing metal bushing in the arbor holes of reels for prestress strand is offered by the Leschen Wire Rope Division of the H. K. Porter Co., Inc.

The bushing is said to assure that the roundness of the arbor hole will be maintained throughout the unreeling process. This eliminates the need for extra pulling force to turn the reel when an unfinished hole gets out of round. By reducing friction on the shaft, the bushing also permits exceptionally easy unreeling.

For further information write to the Leschen Wire Rope Division, H. K. Porter Co., Inc., Dept. C&E, 2711 Hamilton Ave., St. Louis 12, Mo., or use the Request Card at page 18. Circle No. 95.



The Model HD-829 underbody hoist has the capacity for heavy-duty work in quarries, as well as for general hauling assignments.

Single-cylinder hoist handles up to 18½ tons

A new single-cylinder 8-inch underbody hoist that will haul and dump up to 18½ tons of material under normal conditions is announced by the Marion Metal Products Co.

Known as Model HD-829, the unit is designed for use primarily on tandem trucks. Features include large lift arms made of cast-alloy steel and heat-treated to withstand wear and give ample strength. The crosshead is made of heavy rolled steel. Extra strength has been built into the frame to resist bending and torsional stresses. The frame is all-welded with box-type cross members.

For further information write to the Marion Metal Products Co., Dept. C&E, P. O. Box 406, Marion, Ohio, or use the Request Card at page 18. Circle No. 43.

Telescoping cranes reach up to 293 feet

German-built cranes that reach more than 23 stories high are offered by Universal-Liebherr, Inc., a subsidiary of the Universal Mfg. Corp.

The units, called Towercranes, range from approximately 40 feet to 293 feet 6 inches in height, with load capacities up to 24,000 pounds. Traveling on wide-gage tracks and entirely electrically operated, they can boom out over an entire building area permitting spot placement of all required building materials.

The unusual design of its vertical tower enables the crane to begin its job in a telescoped-in position, for construction of the lower floors. Then, under its own power, the unit will telescope out as the building goes up.

A Towercrane Model 56A/72, with a maximum height of 232 feet, is being used in the construction of a municipal garage in Boston. Towercranes are particularly adaptable to placing concrete for structures.

All Towercranes can be completely erected or dismantled under their own power. Transporting of a crane from job to job is easily accomplished by adaptation of standard pneumatic-tire road transport equipment, states the manufacturer.

Towercrane operators ride high in the vertical tower where they can carefully observe all operations, or they can operate the cranes by remote control from any vantage point on the building site.

By use of a simple, 2-lever remote-control desk, operators can perform four Towercrane motions simultaneously: move along the tracks, rotate tower and jib, hoist up and down, and "jib-derrick" by raising and lowering the boom.

For further information write to Universal-Liebherr, Inc., subsidiary of the Universal Mfg. Corp., Dept. C&E, 133 North St., Zelienople, Pa., or use the Request Card at page 18. Circle No. 4.

Madsen provides a drive-through in either of two directions. The mixed-material hopper is located in the center of this drive-through area.

Base-stabilizer plant is portable unit

Madsen Works, a division of Baldwin-Lima-Hamilton Corp., announces the Model 567 portable highway-airport base-stabilizer plant.

Cement, calcium chloride, or bitumens may be used as stabilizing agents. Special features of the plant are ease of erection and dismantling, mechanical simplicity, high and constant production, and precision proportioning and control of cement and water going into the mix.

The pugmill mixer used is a twin-shaft continuous type, designed for producing approximately 600 tph of stabilized base. A unique push-pull gate controls the mixing pressure by maintaining a constant and desired depth of material in the pugmill.

The plant is so designed that the cold feed can be brought in to the mixer on either side of the plant or at the end. A 9-foot-6-inch clearance for trucks is provided. An air-operated clamshell gate is used for discharge to trucks.

For further information write to the Madsen Works, Baldwin-Lima-Hamilton Corp., Dept. C&E, P. O. Box 38, La Mirada, Calif., or use the Request Card that is bound in at page 18. Circle No. 98.

Admixture used in grout for prestressing tendons

Intraplast B, an admixture to be used with mortar for grouting prestressing tendons, is available from the Sika Chemical Corp.

Grout made with Intraplast B is said to be cohesive, nonsettling, and very fluid, assuring complete filling of the voids and spaces between the tensioning strands and their surrounding conduits.

Intraplast is free from impurities such as chloride salts, according to the manufacturer.

For further information write to the Sika Chemical Corp., Dept. C&E, 35 Gregory Ave., Passaic, N. J., or use the Request Card at page 18. Circle No. 99.

Hydraulic wash unit cleans tools, equipment

A new air-powered pressure wash unit for cleaning equipment is announced by the Gray Co., Inc.

Called Hydra-Clean, the unit combines hydraulic spray pressure with a special detergent to flush away, quickly and thoroughly, dirt, grit, grease, grime, or scale.

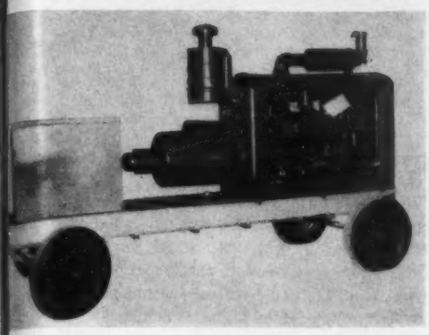
The noncorrosive pump can be used with any full-open drum with a capacity of 15 to 55 gallons. Included is a flexible 40-foot hose and an insulated spray nozzle.

For further information write to the Gray Co., Inc., Dept. C&E, 1036 Sibley St. N. E., Minneapolis 13, Minn., or use the Request Card at page 18. Circle No. 100.

Heavy-duty dc generator for stud-welding work

A new diesel-driven dc welding generator designed for the field installation of ⅞-inch-diameter shear connector and other types of studs is announced by the Nelson Stud Welding Division of Gregory Industries, Inc.

Three heavy-duty NS-9 stud-welding guns may be operated simultane-



This new Nelwelder FD unit furnishes power at 2,000 amp, 80 volts. It was developed especially for stud welding of ⅞-inch-diameter shear connectors and other types of studs.

ly from the new power source. Designated Nelwelder FD, the unit rnishes power at 2,000 amp, 80 volts. ith the addition of available acces- ry controls, the machine may be ed for arc air gaging or hand arc lding.

The engine, directly connected to e generator, is a 6-cylinder 2-cycle 100-rpm water-cooled diesel. It is uipped with an electric starting otor.

Mounted on rubber-tire wheels for ay movement, the generator meas- es 107 inches in over-all length and eighs 5,000 pounds. It is 63 inches gh and 33 inches wide.

For further information write to e Nelson Stud Welding Division, regory Industries, Inc., Dept. C&E, 15 Toledo Ave., Lorain, Ohio, or use e Request Card at page 18. Circle o. 63.

eavy-duty impact wrench as 1 ¼-inch capacity

A new impact wrench, Model 18B-9, ith a rated capacity of 1¼ inches is ailable from the Gardner-Denver o.

The compact, air-powered wrench designed for use on large con-

uction equipment, as well as in ection of steel structures. It weighs ⅞ pounds without dead handle and 13¾ inches long excluding square ive. The fast-starting air motor annot burn out from overloading.

The standard 18B-9 has a 1-inch uare socket driver. Spline drive and complete line of accessory equip- ent are available.

For further information write to e Gardner-Denver Co., Dept. C&E, Front St., Quincy, Ill., or use the rd at page 18. Circle No. 27.

To obtain any of the literature described in this section, circle the number given at the end of the item on the Request Card bound in at page 18 of this issue.

In operating position, the Barber-Greene plant provides more than 9 feet of clearance beneath its discharge hopper, thus requires no truck pit. Its structural supports are locked by pins, and no guy wires nor other external bracing are required.

Stabilization mixing plant is self-erecting unit

A stabilization mixing plant that travels on its own trailer chassis at normal truck speeds, then at the job site lifts itself hydraulically to operating position in 90 seconds, is offered by the Barber-Greene Co.

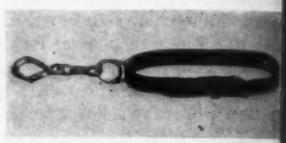
The new unit incorporates one of the company's Model 828 mixing plants, which has a capacity in excess of 400 tph, depending upon the type of material being mixed.

Mobile mounting is provided by a standard 10-ton gooseneck trailer with fifth-wheel hitch. In traveling position, the Model 828 plant is carried entirely within the standard 8-foot highway limits.

For further information write to the Barber-Greene Co., Dept. C&E, 400 N. Highland Ave., Aurora, Ill., or use the Request Card at page 18. Circle No. 69.

Safety belt for workers on reinforcing steel

The Ideal Reel Co. announces a safety belt with safety snap assembly designed especially for ironworkers tying reinforcing steel in place above ground level. According to the company, the snap assembly fastens se-

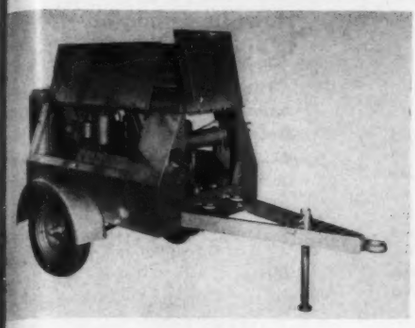


curely to the rebar, freeing both of the workman's hands for safe handling and placement of steel bars.

The snap assembly is said to have a safe working load of 1,125 pounds and a breaking strength of 4,5[illegible] pounds. All of the hardware is cadmium-plated.

The belt and snap assembly are available separately or as a unit.

For further information write to the Ideal Reel Co., Dept. C&E, 14[illegible] Madison St., Paducah, Ky., or use the Request Card at page 18. Circle No. 37.



The Gardner-Denver Model RP85 rotary compressor is designed for jobs requiring limited output with a degree of portability.

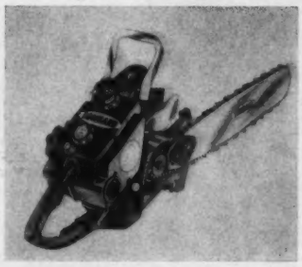
New line of chain saws are light and powerful

The Lombard Governor Corp. announces a new line of chain saws that are claimed to be light and powerful.

Featured is the Tornado 52, a direct-drive, 5-hp saw that weighs 17¾ pounds, less bar and chain.

This unit has a chain oil system that can be cleaned from one exposed position, eliminating the need for dismantling the saw.

For further information write to the Lombard Governor Corp., Dept. C&E, 68 Main St., Ashland, Mass., or use the Request Card at page 18. Circle No. 42.



ew rotary compressor highly portable

A new 85-cfm portable rotary compressor especially designed for jobs requiring limited air output and maximum portability is offered by the Gardner-Denver Co. The unit is powered by a 4-cylinder engine.

Important features of the Model RP85 are: (1) compressor vanes can be easily removed, replaced, or inspected; (2) inspection plates provide access to vital parts for periodic inspection and preventive maintenance; and (3) positive-metered oil flow assures lubrication, cooling, and sealing under all operating conditions.

The self-contained 2-wheel unit is designed to be readily adapted into a truck-mount unit.

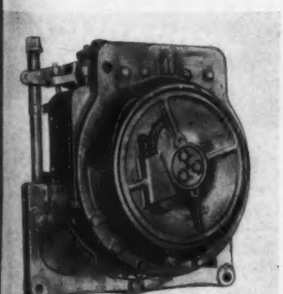
For further information write to the Gardner-Denver Co., Dept. C&E, 1 Front St., Quincy, Ill., or use the Request Card at page 18. Circle No. 101.

able control unit or crawler tractors

The Model 110 front-mounted heavy-duty cable control unit is available for International TD-20 and TD-15 crawler tractors.

Patterned after the Model 150, the single-drum Model 110 unit's major castings are of iron. The unit's weight is 420 pounds.

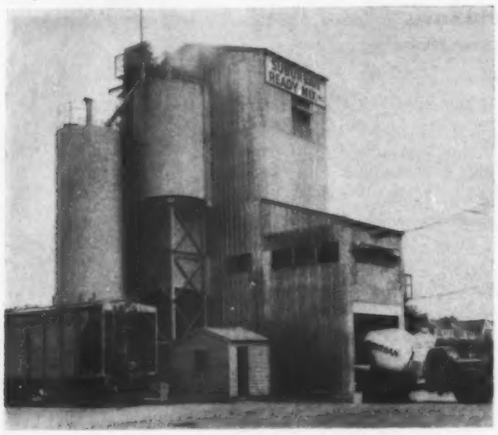
On the TD-20, the cable drum han-



dles 75 feet of cable, with a full-drum speed of 514 fpm and a bare-drum speed of 336 fpm. On the TD-15, 75 feet of cable also can be housed, with a full-drum speed of 447 fpm and a bare-drum speed of 258 fpm.

The Model 110 unit can use up to ½-inch cable.

For further information write to the International Harvester Co., Dept. C&E, 180 N. Michigan Ave., Chicago, Ill., or use the Request Card at page 18. Circle No. 102.

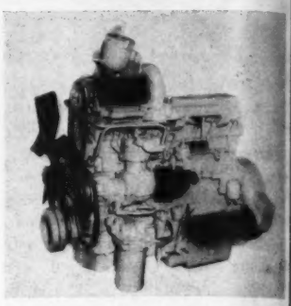


A high-capacity batching plant delivering 6-cubic-yard batches in 1 minute 55-second cycles provides the key to high-specification concrete contracts for Suburban Ready Mix, Inc., Minneapolis, Minn. The plant, manufactured by the Noble Co., has batched over 100 cubic yards per hour. It has overhead storage for 240 tons of aggregates and a separate 2,000-cubic-foot cement ground-storage silo. For further information write to the **Noble Co.**, Dept. C&E, 1860 Seventh St., Oakland, Calif., or use the Request card at page 18. Circle No. 51.

New diesel engine is lightweight unit

The Cummins Engine Co. announces a new lightweight naturally aspirated 160-hp diesel engine for trucking and construction applications.

Known as Model C-160, the unit is



a 6-cylinder engine with a bore and stroke of 4 7/16×5 inches and a piston displacement of 464 cubic inches. Its net weight with standard accessories is 1,555 pounds, equal to 9.7 pounds per naturally aspirated horsepower.

For further information write to the Cummins Engine Co., Inc., Dept. C&E, Fifth St., Columbus, Ind., or use the Request Card at page 18. Circle No. 20.

Portable space heaters offered in two sizes

A new line of Porto-Heat portable oil-fired space heaters has been introduced by the Emglo Products Corp.

Included in this line are two sizes producing 120,000 and 240,000 Btu per hour, respectively. Each size is available in three models—manual, semiautomatic, and automatic control.

Featuring a new double-pass combustion system, these Porto-Heat

rn kerosene, No. 1 or No. 2 fuel oil
der high pressure.

The Model 120 has a 15-gallon fuel nk that provides over 17 hours of ntinuous operation. It is completely lf-contained and mounted on large bber tires for easy portability. It easures 33 inches long, 17 inches de, and 32 inches high. Weight is 5 pounds.

The Model 240 can operate conuously for 8 hours without refilling. has a 2-wheel handle mounting for y moving. Dimensions are: 35 ches long, 18 wide, and 36 high.

The Porto-Heat operates on regur 115-volt 60-cycle circuits and is uipped with an extra-large cord for nnection to standard outlets.

For further information write to nglo Products Corp., Dept. C&E, 6 DuPont St., Johnstown, Pa., or e the Request Card at page 18. Cirle No. 10.

teel-frame shoring rries 20,000 pounds

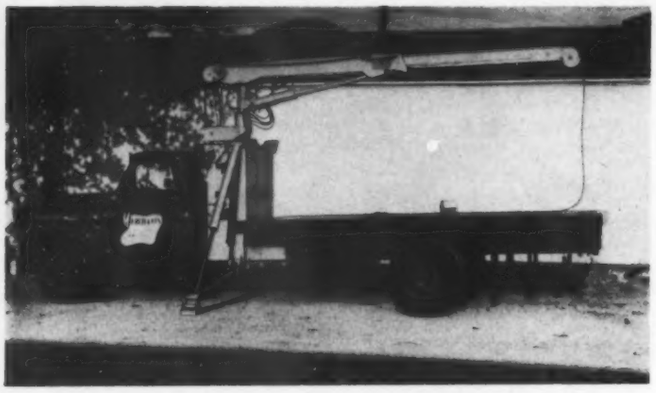
A new line of heavy-duty tubular eel-frame shoring is introduced by afway Steel Products, Inc. According the company, the frames now fely carry up to 20,000 pounds; new eel saddles save time in mounting dgers and joists; and new 4×6-inch llow steel ledgers assemble to any ngth.

Despite the increased capacity, all mponent parts are made in sizes at are easy to handle, assemble, disantle, transport, and store. The rgest frame weighs 69 pounds.

These frames come in heights of ½, 5, and 6½ feet.

For further information write to afway Steel Products, Inc., Dept. &E, 6228 W. State St., Milwaukee 3, Wis., or use the Request Card at age 18. Circle No. 55.

To keep Alaskan roads clear, snow-removal contractors Leonard and Jack Wright use an Allis-Chalmers Model TL-20D TractoLoader to beat the snow problem in the town of North Pole. A fleet of 10 trucks works with the TractoLoader. The loader is equipped with a single-lever speed and direction control: the operator can go from any forward to any reverse speed, while moving, by shifting only one lever. Write to the **Allis-Chalmers Mfg. Co.,** Dept. C&E, P. O. Box 512, Milwaukee., or use the Request Card at page 18. Circle No. 62.



The 400-E's extendible boom feature does not affect the load capacity of the boom or crane. As a result, the boom extends or retracts under full load.

Hydraulic boom extends, retracts under full load

The Model 400-E fully hydraulic Versa-Lift crane, featuring an extendible-retractable boom, is announced by Teale & Co.

According to the manufacturer, the boom's cable take-up system keeps loads at the same height—or distance from the sheave, in the case of vertical movement—as the boom is extended or retracted. Also, regardless of its angle, the boom extends or retracts under full load.

The 400-E works in a full 360-degree circle. Its load capacity is 7,000 pounds at 8 feet (retracted) to 3,500 pounds at 16 feet (fully extended).

For further information write to Teale & Co., Dept. C&E, P. O. Box 308, Omaha, Nebr., or use the Request Card at page 18. Circle No. 82.

Desktop copying machine is multipurpose unit

A completely new Dart desktop multipurpose copying machine in 13 and 18-inch sizes is announced by Copymation, Inc.

The unit reportedly enables anyone to make photographically exact, same-size copies of forms, letters,

charts, diagrams, drawings, or any translucent original. Through the semimoist diazo process, it delivers clear, opaque, black-on-white semi-dry finished prints, which can be used immediately.

Both models include a second lamp for exposing standard photocopy papers. Thus, with an accessory processor, the Dart is a photocopy machine. It plugs into a standard 115-volt ac outlet.

For further information write to Copymation, Inc., Dept. C&E, 5650 N. Western Ave., Chicago 45, Ill., or use the Request Card at page 18. Circle No. 70.

Engine heater eliminates winter starting problems

Thermo-Temp Industries, Inc., announces a new engine heater that automatically maintains operating temperature of the coolant in gasoline, diesel, and propane-fueled engines, even when the engines are not running.

The Thermo-Temp engine heater is an automatic and independently operating unit easily installed on all vehicles. When installed, it becomes an integral part of the cooling system and does not interfere with the normal engine function. It operates on the engine's own fuel supply.

A dashboard control switch can be set on automatic to maintain constant engine temperature control, or a timer can be set for from 5 minutes to 12 hours to preheat the engine prior to starting.

For further information write to Thermo-Temp Industries, Inc., Dept. C&E, 7712 Second, Detroit 2, Mich., or use the Request Card at page 18. Circle No. 56.

The Model 164 has a 10,000-pound lifting capacity. Buckets with capacities of 1 1/3, 1 2/3, and 2 cubic yards are available.

Add two new machines to tractor-shovel line

Two new Trojan tractor shovels, Models 134 and 164, are announced by the Yale & Towne Mfg. Co.

The Model 134 has a lifting capacity of 8,000 pounds. A selection of buckets of 1, 1 1/3, and 1 2/3-cubic-yard capacities is offered. The machine has a dumping clearance of 10 feet 2 inches under the bucket hinge pin and 8 feet 8 inches under the bucket cutting edge.

The Model 164 has a lifting capacity of 10,000 pounds. Buckets with capacities of 1 1/3, and 1 2/3, and 2 cubic yards are available. Dumping clearance for the unit is 10 feet 3 inches under the bucket hinge pin and 8 feet 6 inches under the bucket cutting edge.

Both models are available with either gas or diesel power and are equipped with a full power-shift 3-speed transmission and a 3.5 to 1 torque multiplying torque converter.

The functional design of these Trojan machines is said to afford maximum operational efficiency and service accessibility, full 360-degree visibility, and maximum personal safety for the operator.

For further information write to the Yale & Towne Mfg. Co., Trojan Division, Dept. C&E, Clinton St., Batavia, N. Y., or use the Request Card at page 18. Circle No. 24.

Replacement roller seals for crawler tractors

Truseal replacement roller seals for Caterpillar and International crawler tractors are offered by the Ceeco Engineering Corp.

An all-metal chrome-plated housing encases the entire sealing unit, which is permanently installed at the factory, eliminating rubber bellows.

According to the manufacturer, the unit works without pressure; yet, when pressures are created, it offers a more perfect seal that keeps grease in and dirt out.

Spring failures are said to be eliminated by the use of eight high-grade piano-wire springs set in rubber to provide optimum distribution of balance.

For further information write to the Ceeco Engineering Corp., Tractor Parts Division, Dept. C&E, 1511–1513 Border Ave., Torrance, Calif., or use the card at page 18. Circle No. 36.

Hydraulic press services center, end bushings

A hydraulic press that removes and installs equalizing-beam center and end bushings on Hendrickson tandems is announced by the Owatonna Tool Co.

Designated Model Y800-A, the new unit consists of a press frame mounted on casters to roll easily on the floor, seven special adapters for removing and installing applications, and a 30-ton-capacity OTC Power-Twin center-hole hydraulic ram and pump assembly.

According to the manufacturer, the center and end bushings can be serviced without removing the tires or wheels.

For further information write to the Owatonna Tool Co., Dept. C&E, 381 Cedar St., Owatonna, Minn., or use the Request Card at page 18. Circle No. 81.

Electric plant mounts on trailer or skids

A 10,000 AD electric plant, available either trailer-mounted or on skids, is offered by Pacific Mercury.

The plants are 60-cycle, 120/240 or 120/208-volt units, single or 3-phase, with 4-cycle, 4-cylinder, air-cooled Wisconsin engines. Sixteen outlet receptacles for convenient operation of power tools or other equipment are standard.

For further information write to Pacific Mercury Mfg. Corp., Dept. C&E, 14052 Burbank Blvd., Van Nuys, Calif., or use the Request Card that is bound in at page 18 of this issue. Circle No. 103.

One-yard tractor shovel features 4-wheel drive

A new 26-mph 1-cubic-yard-capacity Michigan tractor shovel is announced by the Construction Machinery Division of the Clark Equipment Co.

Designated Model 55A, the unit has 4-wheel drive and is equipped with a 66.5-hp gasoline engine. It has a working weight of 10,500 pounds and reportedly will lift and carry up to 7,000 pounds.

The machine offers a 4-speed forward and reverse power-shift transmission, planetary wheel axles, and torque converter as standard equipment.

Low-pressure, wide-base tubeless tires—1300×24 on all wheels—also are standard equipment. Abrasive-resistant rock tires are available.

The Model 55A has a maximum dumping height of 8 feet.

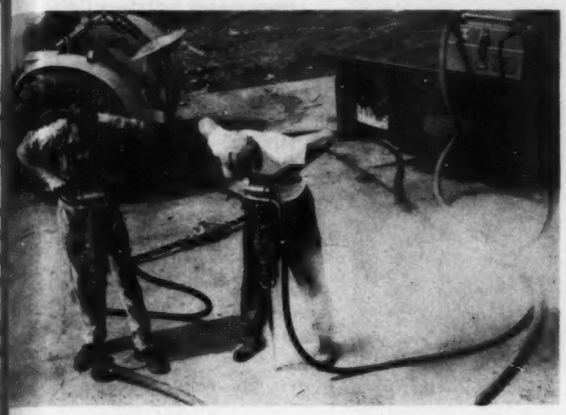
For further information write to the Construction Machinery Division, Clark Equipment Co., Dept. C&E, Pipestone Road, Benton Harbor, Mich., or use the Request Card at page 18. Circle No. 104.

Speaker sends messages hundreds of feet

Motorola has introduced a 15-watt speaker for use with its Motrac 2-way radio line. Fully transistorized, the new Power Voice speaker triples normal speaker audio output.

As an additional feature, the speaker is equipped with an 8-foot coil cord and special brackets that permit temporary mounting of the speaker outside the vehicle window.

For further information write to Motorola, Inc., Communications & Industrial Electronics Division, Dept. C&E, 4501 W. Augusta Blvd., Chicago 51, Ill., or use the Request Card at page 18. Circle No. 80.



Dust and cuttings from drilling are trapped by a collar and are drawn through a hose to the Le Roi dust-collecting tank.

Dustless drilling system for all rock drills

A new dust-collecting system for use with hand-held sinker drills is offered by the Le Roi Division of the Westinghouse Air Brake Co. It can be used with any make of rock drill, according to the manufacturer.

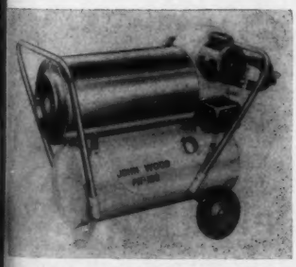
Operation of the dust-collecting system is simple: dust and cuttings are trapped by a collar that fits around the drill steel and are "inhaled" through a connecting hose to a Le Roi DK280 dust-collecting tank. The tank can be mounted on any compressor-carrying truck, portable compressor, or Le Roi's combination tractor-compressor, the Tractair. It has a big 23-inch-wide, 16-inch-long, and 7-inch-deep drawer that pulls out for disposal of dust and cuttings.

For further information write to the Le Roi Division, Westinghouse Air Brake Co., Dept. C&E, 1706 S. 70th St., Milwaukee 1, Wis., or use the card at page 18. Circle No. 72.

Space heater produces 120,000 Btu per hour

A new portable heater is offered by the John Wood Co.

Designated Model 120, the unit will burn kerosene, No. 1 or No. 2 diesel, or fuel oil. A Sirocco-type blower pro-



vides positive air flow. Weighing only 140 pounds, the portable heater can produce 120,000 Btu per hour.

Dimensions are: length, 37 inches; width, 21½ inches; height, 31 inches. With a heated air output of 450 cfm, the portable heater can be operated continuously for up to 16 hours. The 1/6-hp motor takes 115 volts of 60-cycle ac power.

For further information write to the John Wood Co., Heater and Tank Division, Dept. C&E, Conshohocken, Pa., or use the Request Card at page 18. Circle No. 15.

New utility tractor is versatile machine

A new utility tractor, the Model 65, is announced by the Massey-Ferguson Industrial Division.

It features a dual-range transmission with six speeds forward and two reverse, hydraulic draft control for 3-point attachments, and a 2-stage clutch that permits operation of the attachments when the tractor is not in motion. A new, heavy-duty front axle and power steering are standard.

For further information write to the Massey-Ferguson Industrial Division, Dept. C&E, 1009 S. West St., Wichita 13, Kans., or use the Request Card at page 18. Circle No. 12.

A variety of attachments including the Davis loader, backhoe, and scarifier-scraper are available for the new utility tractor Model 65.

Improved hoist-puller has 1½-ton capacity

An improved 1½-ton-capacity Power-Pull manual hoist-puller is available from the American Gage & Mfg. Co.

The new model, with 3/16-inch pre-formed aircraft cable, weighs only

7½ pounds but enables one man to lift, lower or move over 3,000 pounds. Attachments and adapters are available for special uses on specific jobs.

According to the manufacturer, complete cable replacement can be accomplished in the field in minutes.

For further information write to the American Gage & Mfg. Co., Dept. 0–15, Dept. C&E, 125 Bayard St., Dayton 1, Ohio, or use the Request Card at page 18. Circle No. 90.

Impact wrench features 1,000-pound torque

A new torque-control reversible impact wrench, capable of consistently accurate and fully controlled torque output as high as 1,000 foot-pounds, has been introduced by the Chicago

eumatic Tool Co.

Designated Model CP–612–RLTP, e tool can be used for torquing 1, ⅞, and 1¼-inch high-tensile bolts structural steel erection. It can o be used as a conventional im- ct wrench with a full 1½-inch bolt pacity by pressing the lockout but- n, placed above the pistol-grip ndle.

For further information write to e Chicago Pneumatic Tool Co., ept. C&E, 6 E. 44th St., New York 1, N. Y., or use the Request Card that bound in at page 18 of this issue. ircle No. 71.

Natural-gas space heater converts to lpg unit

The Aeroil Products Co. has avail- ble a 200,000-Btu natural-gas, or anufactured-gas, space heater.

This unit will operate efficiently on essures as low as 6 ounces, and the n is operated on a 110/115-volt ac e. The heater can be quickly trans- rmed into an lpg high-pressure ace heater by simply changing the rner nozzle and including in the e a specially built pressure regu- tor.

For further information write to e Aeroil Products Co., Dept. C&E, Wesley St., South Hackensack, J., or use the Request Card at ge 18. Circle No. 85.

To obtain further information on y of the products described in this ction, circle the number given at e end of the item on the handy equest Card at page 18.

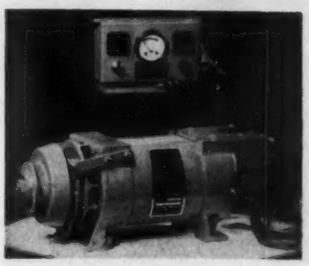
Engine-mounted generator for trucks, tractors

GenerAc Sales Inc. announces a new 5,000-watt 220-volt 3-phase truck-mounted generator.

The unit may be driven directly from the truck engine or from the truck transmission by means of a power takeoff. Mounting kits are available for adapting this model to all popular makes of trucks.

A control panel is supplied with each GenerAc. This panel consists of a meter to indicate the unit's proper operating range. Field and clutch switch fuses and a 110-volt ac outlet and engine throttle control are also included in the panel.

For further information write to GenerAc Sales Inc., Dept. C&E, 124 S. Main St., Wales, Wis., or use the card at page 18. Circle No. 64.



Product LITERATURE

To obtain free copies of any of the literature described in the following section, circle the designated number on the Request Card at page 18.

Crusher—a bulletin describing the mechanical features of the Allis-Chalmers Hydrocone 36-inch crusher. Available with instantaneous hydraulic adjustment for wear and product size, the crusher can be obtained with fine, intermediate, or coarse crushing chambers. Bulletin No. 17B9296.

Write to the Allis-Chalmers Mfg. Co., Construction Machinery Division, Dept. C&E, P. O. Box 512, Milwaukee, Wis., or use the Request Card at page 18. Circle No. 25.

Tractor—a brochure featuring the Napco Crab 4-wheel-drive, 4-wheel-steer industrial tractor. Highlights such features as power steering, torque converter, hydraulic reversing clutch, planetary axles, and 4-wheel hydraulic brakes. Action photographs and spex. Brochure No. CT-1959.

Write to the Construction Equipment Division, Napco Industries, Inc., Dept. C&E, 834 N. Seventh St., Minneapolis, Minn., or use the Request Card at page 18. Circle No. 44.

Installing structural steel bolts—an illustrated chart showing the proper procedure for installing high-strength structural steel bolts. Covers the procedure in four principal steps. Identification of high-strength bolts is explained, together with the advantages of bolting structural steel members. Form Adv. 982.

Write to the Republic Steel Corp., Dept. C&E, 1441 Republic Bldg., Cleveland 1, Ohio, or use the Request Card at page 18. Circle No. 53.

Concreting accessories—a catalog describing the Sylgab line of accessories for concrete construction. Well illustrated with photographs, charts, and drawings.

Write to the Sylgab Steel & Wire Corp., Dept. C&E, 79-05 Cooper Ave., Brooklyn 27, N. Y., or use the Request Card at page 18. Circle No. 76.

Bituminous hauling tanks—a bulletin describing all three models of Etnyre bituminous hauling tanks. Discusses benefits of various-shaped designs; gives specifications of standard and auxiliary equipment. Illustrated with photos and drawings. Bulletin No. 114.

Write to E. D. Etnyre & Co., Dept. C&E, 200 Jefferson St., Oregon, Ill., or use the Request Card at page 18. Circle No. 120.

Portable heaters—a brochure featuring the complete line of Insto-Hot salamanders, blower heaters, and infrared heaters. Also gives information on accessories. Catalog No. 259B.

Write to the Insto-Gas Corp., Dept. C&E, 998 E. Woodbridge, Detroit 7, Mich., or use the Request Card at page 18. Circle No. 121.

Shovel-crane—a bulletin on the new 18-ton Lorain Moto-Crane Model MC-218. Describes such features as the 6×4 carrier with 2-position turntable mounting, hydraulic power steering, power brakes, integrally welded outrigger boxes. Some turntable features covered are one-piece truss-reinforced bed, compact clutch shaft assembly, and power-load-lowering antifriction bearings.

Write to The Thew Shovel Co., Dept. C&E, 28th and Fulton Road, Lorain, Ohio, or use the Request Card at page 18. Circle No. 107.

Calcium chloride—a 40-page technical manual on calcium chloride in concrete. Contains data on major effects of calcium chloride, early and ultimate strength, cold-weather protection, high-early-strength cement, and air-entrained concrete. Illustrations; specifications.

Write to the Calcium Chloride Institute, Dept. C&E, 909 Ring Bldg., Washington 6, D. C., or use the Request Card at page 18. Circle No. 108.

Electric generating sets—a folder describing the entire new Onan line of diesel-engine-driven electric generating sets. Includes specifications and illustrations of these units, which range in size from 3,000 to 6,000 watts (air-cooled) and from 10,000 to 230,000 watts (water-cooled). Folder F-142.

Write to D. W. Onan & Sons Inc., Dept. C&E, 2515 University Ave. S. E. Minneapolis 14, Minn., or use the Request Card at page 18. Circle No. 109.

Air-entrainment meter—a folder describing the Techkote White air meter for proper control of entrained air in concrete. Well illustrated with photographs; gives detailed operating instructions. Specifications included. Form No. AM 102-S.

Write to Soiltest Inc., Dept. C&E, 4711 W. North Ave., Chicago 39, Ill., or use the Request Card at page 18. Circle No. 110.

Scaffolds—a catalog describing Baker scaffolds. Stresses such features as adaptability, safety, fast set-up, and easy assembly. Well illustrated with close-ups of various components and on-the-job photographs. Form No. 10-559.

Write to Baker-Roos, Inc., Dept. C&E, 602 W. McCarty St., Indianapolis 6, Ind., or use the Request Card at page 18. Circle No. 40.

To obtain the literature described on this page, write to the manufacturer or circle the designated number on the Request Card at page 18.

Motorized wheel—literature on the GE electric motorized wheel for large off-highway excavation vehicles. Drawings indicate types of vehicles that can utilize this new type of drive; graphs provide statistics on speed, efficiency, and tractive effort when either two or four motorized wheels are used. Bulletin GEA-6931.

Write to the General Electric Co., Dept. C&E, 1 River Road, Schenectady 5, N. Y., or use the Request Card at page 18. Circle No. 22.

Crawler parts—a brochure illustrating the Tisco line of bulldozer sprocket rims, tractor pads, end bits, and blades. Also describes procedures for rapid installation of Tisco sprocket rims.

Write to the Taylor-Wharton Co., Dept. C&E, High Bridge, N. J., or use the Request Card at page 18. Circle No. 47.

Steel liner plates—a bulletin containing technical information on commercial steel liner plates for excavation support in tunnel and shaft construction. Includes tables of suggested thicknesses of plates for a variety of uses, as well as a table of permissible safe loads on circular tunnels of various diameters of arch. Also gives data on installation procedures and tunneling methods. Photographs illustrate text. Bulletin 300-C2.

Write to the Commercial Shearing & Stamping Co., Dept. C&E, P. O. Box 239, Youngstown, Ohio, or use the card at page 18. Circle No. 77.

Welding equipment—literature featuring the Smith line of gas-welding, cutting, and allied equipment. Illustrations show the equipment in proper size relation. Also includes charts and technical data on the various items.

Write to the Smith Welding Equipment Corp., Dept. C&E, 2633 Fourth St. S. E., Minneapolis 14, Minn., or use the Request Card at page 18. Circle No. 116.

Hose and fittings—128 pages of fully illustrated, easy-to-find specifications, technical data, sizes, descriptions, applications, and installation instructions on Weatherhead hose and hose assemblies, brass and steel tube fittings, hose and tube working tools, stock cabinets, hose racks, and other specialty products.

Write to The Weatherhead Co., Fort Wayne Division, Dept. C&E, 128 W. Washington Blvd., Fort Wayne, Ind., or use the Request Card at page 18. Circle No. 117.

Remote-control batching—a booklet describing and illustrating remote-control equipment for Galion batchers. Includes data on cab-operated push-button control panels, side-mounted trippers, and hydraulic stabilizers and levelers. Gives complete specifications for the firm's 3-batch single-axle model, the 4-batch tandem-axle model, and a special 8-batch dump-trailer model. Form No. 209.

Write to the Galion Allsteel Body Co., Dept. C&E, Galion, Ohio, or use the Request Card at page 18. Circle No. 118.

Sand and gravel plant equipment—a catalog featuring Reliance equipment for sand and gravel plants. Describes machinery for scrubbing, washing, crushing, and classifying. Well illustrated with dimensional drawings, charts, and photographs.

Write to the Universal Road Machinery Co., Dept. C&E, 27 Emerick St., Kingston, N. Y., or use the Request Card at page 18. Circle No. 119.

Air compressors—a folder describing the design and operating characteristics of Lindsay Model 55, 80, and 125 radial-type air compressors. Gives brief specifications; photographs illustrate the text.

Write to the P. K. Lindsay Co., Inc., Dept. C&E, 97 Tileston St., Everett 49, Mass., or use the Request Card at page 18. Circle No. 115.

Steel road forms—an illustrated bulletin on Rex steel road forms. Includes selection data on form accessories. Bulletin No. 59165.

Write to the Chain Belt Co., Dept. C&E, 4701 W. Greenfield Ave., Milwaukee, Wis., or use the Request Card at page 18. Circle No. 113.

Concrete-cylinder casting—literature on approved concrete-cylinder casting procedures including selection of molds, correct sample taking, and the filling, handling, and curing of cylinders. Suitable for posting at job sites where testing is performed. Bulletin RM-48.

Write to The Master Builders Co., Dept. C&E, 7016 Euclid Ave., Cleveland 3, Ohio, or use the Request Card at page 18. Circle No. 112.

Carbon-dioxide welding—a 38-page booklet on Migarc (Hobart's metal-inert-gas-shielded-arc process) welding of mild steel and low-alloy steels with carbon-dioxide shielding gas. Describes carbon-dioxide welding and provides comprehensive information on equipment and power sources, deposition rates, welding preparation and positioning, electrode wires, weld-metal properties, test specimens, welding factors, tables and charts.

Write to Hobart Bros. Co., Dept. C&E, Hobart Square, Troy, Ohio, or use the Request Card at page 18. Circle No. 111.

Photocopy applications—a booklet listing 115 ways a photocopy machine can be utilized. Includes a brief description of the way photocopy reproductions are employed.

Write to F. G. Ludwig, Inc., Dept. C&E, 163 Coulter Place, Old Saybrook, Conn., or use the Request Card at page 18. Circle No. 114.

For more facts, circle No. 344→

Names in the News

Frank Finney named V.P. for Conly Engineering

Frank B. Finney has been appointed vice president and resident director for the San Diego office of the Conley Engineering Co., Los Angeles.

Prior to joining the Conley firm, Finney worked in various engineering capacities for San Diego and National City, Calif.

He is a member of the San Diego Council of Civil Engineers and Land Surveyors, the California Council of Civil Engineers and Land Surveyors, and the San Diego Engineers Club.

John A. Volpe, left, and M. Clare Miller, nominees for president and vice president, respectively, of the AGC.

Volpe, Miller nominated to head AGC in 1960

John A. Volpe and M. Clare Miller have been nominated for president and vice president, respectively, in 1960, for The Associated General Contractors of America. The official vote by AGC members will be conducted by mail ballot this month. According to custom, Volpe, who is now vice president, was nominated for the top post, and is expected to be installed at the annual convention in March in San Francisco, to succeed current president James W. Cawdrey.

Volpe, former Federal Highway Administrator, is president of the John A. Volpe Construction Co., Malden, Mass. Miller heads the San Ore Construction Co., McPherson, Kans.

Robert L. Allshouse, construction manager for Stone & Webster Engineering Corp.

Stone & Webster names construction manager

Robert L. Allshouse has been named a construction manager for Stone & Webster Engineering Corp., Boston and New York City. His headquarters will be in Boston. As the firm's superintendent of construction in Texas and Louisiana, Allshouse has been in charge of construction of central power stations.

PCA promotes two

George Hugh Tsuruoka is the new manager of the Housing and Cement Products Bureau of the Portland Cement Association. He succeeds S. H. Westby, who was named technical advisor in the bureau.

Westby will work with other segments of the home-building industry in developing new techniques and applications of concrete in home construction. He will also advise on the technical aspects of concrete in this field. He joined the PCA in 1943.

AISC names Edmonds

John K. Edmonds has been appointed assistant executive vice president of the American Institute of Steel Construction. His office will be in the institute's headquarters in New York City.

Highway department news

James M. Carroll has been appointed highway superintendent in Centre County, Pa., by the Pennsylvania Department of Highways. He replaces Ralph H. Shook.

B-E head is named to management council

Robert G. Allen, president and chief executive officer of Bucyrus-Erie Co., South Milwaukee, has been appointed to the Planning Council of the General Management Division of the American Management Association. He is one of six members.

The new appointees will join with other top executives in serving the AMA on a voluntary basis.

Col. Herrol J. Skidmore, director of the U. S. Army Engineer Research and Development Laboratories, Fort Belvoir, Va.

Col. Skidmore heads Corps' research labs

Col. Herrol J. Skidmore has been assigned as director of the U. S. Army Engineer Research and Development Laboratories, Fort Belvoir, Va. Col. Skidmore was previously district engineer in Huntington, W. Va. He succeeds Col. A. H. Davidson, Jr., who has been assigned to the Engineer Section, U. S. Army, Europe.

Manufacturers Memos

John D. Bros, vice president and works manager of Bros Inc.

Three executive promotions have been announced by **Bros Inc.**, Minneapolis. **John D. Bros**, who is works manager, has been appointed a vice president of the road-machinery firm. **Reuben Moberg**, former chief estimator, has been promoted to secretary-comptroller. **G. Russell Carpenter**, previously works manager of Minneapolis Moline, is now Bros Inc.'s assistant works manager.

Dorsey Trailers, Elba, Ala., has named **Roy Belcer** head of Dorsey research and development. He has been a design engineer for the past eight years.

Two other changes in executive personnel have been made. **T. K. Dorsey**, executive vice president, has assumed full charge of sales, following the resignation of **Horton Fick**, vice president; and **Henry Dorsey** fills the newly created post of director of programming.

The Philip Carey Mfg. Co., Cincinnati, Ohio, has made **Ray Wolcott** a sales manager of the St. Louis district. Prior to joining the company, Wolcott was sales manager for the H-C Sales Co., Peoria, Ill.

Andrew J. Cox has been appointed administrative assistant to the general manager of the construction machinery section, **Chain Belt Co.**, Milwaukee. With prior experience in naval ordnance manufacturing, Cox has been active in the construction-machinery industry for the past five years.

Two major executive appointments have been made in the Scaffolding Division, **Waco Mfg. Co.**, Cleveland. **Hugh J. Ferguson**, chief engineer, promoted to the post of regional sales manager for the Midwest region, will cover all central states as far west as Colorado, Wyoming, and Montana.

Hugh J. Ferguson, left, regional sales manager, and Richard C. Mocny, chief engineer, Scaffolding Division, Waco Mfg. Co.

Ferguson's former post will be taken over by **Richard C. Mocny**, who joined Waco early this year as an engineering supervisor.

Allis Chalmers Mfg. Co., Construction Machinery Division, Milwaukee, Wis., has appointed sales representatives for each of its branches to concentrate on the sale of products of its Deerfield, Ill., works.

The representatives and their branches in the Western Region are: **E. A. Banfield**, Minneapolis; **E. C. Metcalf**, Dallas; **J. M. McKellar**, Denver; **W. D. Rankin**, Portland; **N. K. Rasmussen**, Oakland; and **W. H. Sihler**, St. Louis.

Union Wire Rope Corp., Kansas City, Mo., has promoted **D. E. Bedford** to the post of regional manager for Washington, Oregon, California, Arizona, Nevada, western Montana, and most of Idaho with headquarters in San Francisco.

D. E. Bedford, regional manager for Union Wire Rope Corp.

The new branch manager in charge of the Portland, Ore., office and warehouse is **Dom A. Villanueva.** He continues to travel in Washington, Oregon, and western Montana and Idaho.

The former Southeastern representative, **Richard K. Erickson**, has been transferred to Los Angeles.

Top ranking officers have been named by **The Jaeger Machine Co.**, Columbus, Ohio. **James D. Anderson** holds the new post of vice president of sales. **John H. Apel** is vice president of engineering succeeding **Arnold S. Milliken**, who has retired; **Bruce C. Behmer**, treasurer and assistant secretary, and **Perry D. Schwartz**, secretary and assistant treasurer, succeed **John M. Ulrich**, retiring secretary-treasurer.

James D. Anderson, vice president of sales for The Jaeger Machine Co.

Gebhard W. Keny has been elected to the board of directors.

Generally accepted accounting principles for contractors

Part 3: Working capital and equipment

Financial statements of contractors are prepared on the "going-concern" basis, namely on the assumption that a company will continue in business. Usually, the certified public accountant's opinion is based on the same assumption. With this in mind the committee on accounting procedure of the American Institute of Certified Public Accountants departed from a narrow definition or strict one-year interpretation of either current assets or liabilities. It related the criteria of determining current assets or liabilities to the operating cycle of the business involved.

The committee described its concept of the operating cycle as follows:

"The ordinary operations of a business involve a circulation of capital within the current asset group. Cash is expended for materials, . . . labor, and . . . services, and such expenditures are accumulated as . . . costs. These costs . . . are converted into . . . receivables and ultimately into cash again. The average time intervening between the acquisition of materials or services entering this process and the final cash realization constitutes an operating cycle. A one-year time period is to be used as a basis for the segregation of current assets in cases where there are several operating cycles occurring within a year. However, where the period of the operating cycle is more than twelve months, as in, for instances, the tobacco, distillery, and lumber businesses, the longer period should be used. Where a particular business has no clearly defined operating cycle, the one-year rule should govern. The term 'current liabilities' is used principally to designate obligations whose liquidation is reasonably expected to require the use of existing resources properly classifiable as current assets, or the creation of other current liabilities."

With this concept in mind, the institute issued a bulletin discussing both the percentage-of-completion and the complete-contract methods. It suggested that amounts of costs, billings, and income be included in either current assets or current liabilities.

For instance, a moderate-sized subcontractor normally engaged in residential construction and repair work (for which the contracts are usually of only several months' duration)

This is the third of four installments on accounting principles generally accepted by the accounting profession for use by contractors. The material, which is being published in booklet form by the American Institute of Certified Public Accountants, 270 Madison Ave., New York 16, N. Y., represents the thinking of the institute's committee on accounting procedures.

such items should be excluded from the current-asset category.

Joint-venture investment

Occasionally, the question also arises as to whether a contractor's investment in a joint venture is a current asset. Generally speaking, such an investment would be classifiable as a current asset if and to the extent that the underlying assets of the venture were classed as current in the statements applicable to the venture. If the operating cycle of the venture does not parallel that of the contractor investor, that fact should be disclosed.

Sometimes it is argued that, under the completed-contract method, the excess of billings over related costs should not be shown as a current liability because, at least in part, it represents income to the contractor, but should be shown as deferred income. The committee suggested, in recommending the selection of a method, that the completed-contract method was preferable only when dependable estimates of total costs were lacking or when inherent hazards caused forecasts of total costs to be doubtful. When a contractor has adopted the completed-contract method because of a lack of dependable estimates or inherent hazards, he can hardly argue in advance of substantial completion of a contract that "X dollars" represent profit earned to date or deferred income. In discussing the completed-contract method, it has been noted that income should be recognized on substantial completion of a contract. In such circumstances, obviously, the recording of deferred income in the balance sheet would be improper. It must be recognized also that while a project is in process, a portion or all of the excess of billings over related costs may represent advance payments by the contractor's client. The most practical and conservative solution, therefore, is to treat such items as liabilities, in most cases as current liabilities, until the income on the contract has been proved to be realized by substantial completion thereof.

Contractor's equipment

Contractors either own or rent heavy equipment such as trucks, graders, concrete mixers, scrapers,

ould normally, since "there are several operating cycles occurring within a year," classify his costs and billings s current assets and liabilities under he one-year rule. If he were functioning as a subcontractor for a large housing development that might take several years to complete, the retainage would properly be excludable rom the current assets of the plumbing contractor until its collection ould be expected within a one-year eriod. In contrast, the liability to he subcontractor for the retainage ould be properly classifiable by the eneral contractor as a current liability if that contractor had a normal usiness cycle of several years' duration.

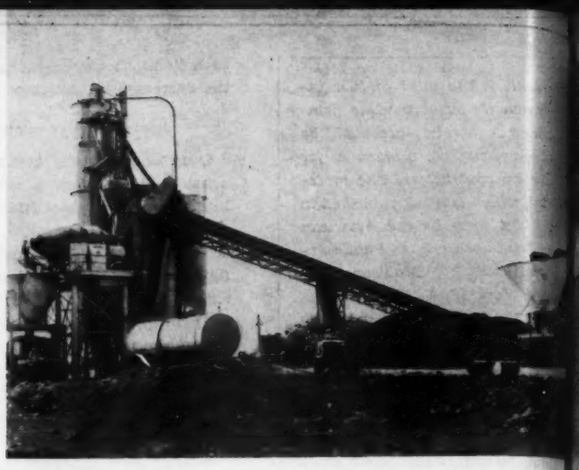
Observance of the philosophy or oncept of this bulletin will be seen n the published financial statements f large contractors employed on such ng-term projects as shipbuilding or lectric-generating-station construction. Because such contracts have a ormal long-term business cycle, their osts and billings are properly classifiable as current assets or current iabilities.

Judgment must be exercised to determine the period of a contractor's perating cycle. Where the contractor tends to specialize in a certain ype of project, his normal business ycle is likely to be clearly defined. n the other hand, where his business is diverse and the period for ompletion varies markedly, it would ppear that the longest period representing a substantial portion of the usiness would represent the normal perating cycle; all contracts with esser periods would also fall within he working-capital classification.

Questions are sometimes raised bout such items as the cash surender value of life insurance. Why n't it normally shown as a current sset? Such insurance is not purhased by a company with the idea f cashing it in when the company equires working capital, and it may herefore be considered comparable to ny other noncurrent asset a company has no intention of selling, but which may be pledged as collateral for a loan. The term "current assets" hen is used to designate cash and other assets or resources commonly identified as those which are reasonably expected to be realized in cash, old, or consumed during the normal perating cycle of a business. When here are reasonable doubts as to the collectibility of any items in the ordinary operating cycle of a business,

Construction Camera

Four operations—backfilling, rough grading, excavation, and the handling of old asphalt—are done by a Trojan Model 154 tractor shovel at United Air Lines Arrival Terminal at Idlewild Airport, Long Island, N. Y. The rig is heaping 10 yards of sand into the Reo rear-dump.



The 800,000 square yards of concrete for the 9-inch-thick pavement of U. S. 33 near Lancaster, Ohio, is supplied by this Noble batching plant equipped with a 10-cubic-yard tilting mixer. While mixing is being done, the next batch of dry materials is discharged onto the 60-inch-wide conveyor.

(Continued from preceding page)

cranes, power shovels, derricks, air compressors, rock drills, and pumps.

When heavy equipment is rented, the accounting is comparatively simple. The cost of such equipment is allocated to the particular jobs where it is used on some reasonable basis such as time, mileage, etc. Substantial rental commitments should be disclosed in footnotes to a contractor's financial statements. When rented equipment is owned by an affiliate, the rental costs should be separately disclosed and identified. Intercompany profits from such rentals should, of course, be eliminated in the preparation of consolidated financial statements.

Leasing

Vendors of contracting equipment sometimes lease their equipment to contractors with an option to purchase at a later date. Such arrangements must be clearly distinguishable from a conditional or outright sale of the equipment. Purchase option rentals offer the advantages of immediate rental deductions for tax purposes (which can be larger than depreciation allowances), smaller immediate outlay of funds, and an opportunity to evaluate the equipment under operating conditions.

Rental amounts paid by the contractor lessee should be recorded as job costs or expenses. The net amount paid (that is, gross price for the equipment less rentals allowed against that price) should, on exercise of the purchase option, be capitalized and depreciated over the remaining useful life of the equipment.

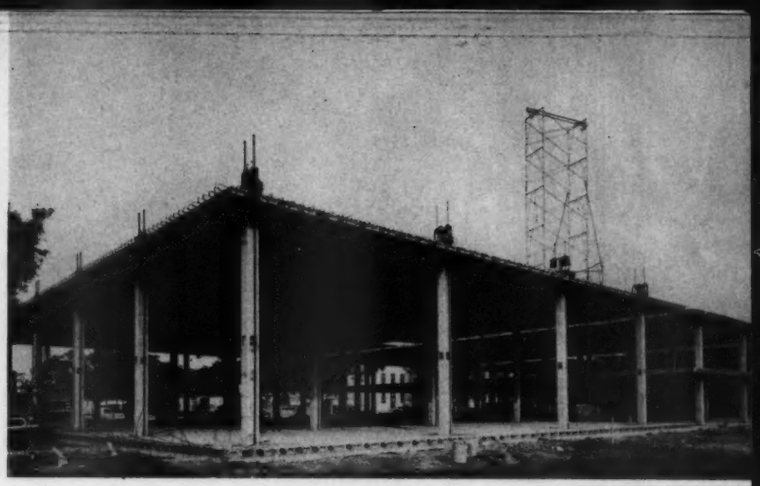
Under some circumstances, a lease arrangement may represent no more than an installment purchase of the equipment. This may be the case in the following circumstances:

1. When the lease is made subject to the purchase of the equipment for a nominal sum or for an amount obviously much less than its fair value at the time of purchase.

2. When the lease agreement stipulates that the rentals may be applied in part as installments on the purchase price of the equipment.

3. When the rentals obviously are not comparable with other rentals for

No. 5 topping stone to be spread on hot asphalt in renewing the surface of 15 miles of roadway south of Crane, Texas, is loaded from stockpile to the 4 to 6-yard trucks of the haul fleet by this Model H-90 Payloader. Cen Tex Paving Co., Andrews, Texas has the contract for the renewal project.



Four lift-slab roof panels and four second-floor panels, each weighing 700 tons, are used in the new headquarters for the U. S. Geological Survey at Menlo Park, Calif. The panels were cast on the job site, with Thompson's Water Seal used as curing agent and bond breaker.

similar equipment so as to create the presumption that portions of such rentals are partial payments under a purchase plan.

In these circumstances, it should not be assumed necessarily that just because the lessee does not have legal title to the property and does not assume any direct mortgage obligation that it would be improper to include the equipment among the contractor's assets and to show the related indebtedness as a liability. The underlying facts relating to all leases such as this should be very carefully considered and, where it is clearly evident that the transaction is in substance a purchase, the leased equipment should be included among the assets of the contractor-lessee with suitable accounting for the corresponding liability and for the related depreciation and interest charges in the contractor's income statement.

Owned fixed assets of contractors are usually recorded at cost and classified into three general categories: (1) heavy machinery and equipment, (2) miscellaneous tools and equipment, and (3) trucks and autos.

When the operating costs of equipment are substantial in amount, it is essential for the contractor to maintain an equipment operating cost ledger. This record not only supplies information as to the location of the equipment but more importantly serves as a basis for allocation of costs to specific jobs and by comparisons between similar equipment provides information as to relative efficiency and economy of the equipment. Most contractors establish a unit cost of operation for pieces of equipment and charge the jobs at these rates. Operating and maintenance costs of miscellaneous small tools and equipment are usually charged to overhead accounts rather than to specific jobs. However, a contractor may allocate such costs directly to specific jobs where the costs relate to such jobs.

The "use-rate" theory

In establishing operating unit costs for equipment, it is appropriate for contractors to apply rates arrived at under the so-called "use-rate" the-

(Continued on next page)

Construction Camera

Rock that will be used in the concrete curtain of the Santa Rosa hydroelectric dam near Guadalajara, Mexico, is loaded out to a haul unit by a Manitowoc Model 2000 1¼-yard shovel. The dam is being built for the Federal Commission of Electricity and will be connected with an independent company.

In the first phase of work for St. John's Hospital in St. Louis County, Mo., Euclid scrapers are handling 200,000 cubic yards of earthmoving. Fruin-Colnon Contracting Co., St. Louis, is also installing 7,100 feet of pipe and paving 63,000 yards of parking areas and roads.

(Continued from preceding page)

ory. In applying this theory, the following factors must be considered: (1) the cost of the equipment, less estimates of its salvage value, or its rental cost if it is not owned equipment, (2) the probable life of the equipment, (3) the average idle time during the life or period of hire of the equipment, and (4) the costs of operating the equipment—such as repairs, storage, insurance, and taxes. From these factors, rates per hour, day, or week, etc., may be arrived at which, based on the reported use of the equipment, will serve as a basis for charging the jobs on which the equipment is being used. Since the early 1920's, the Associated General Contractors of America has made frequent studies of the operating costs of various types of equipment on construction work and has issued schedules of rates.

The word, "depreciation" is an outstanding example of a term that has a specialized meaning in its accounting senses and has other meanings to engineers and economists, as well as in common English usage. The institute committee on terminology recognized the obligation of the accounting profession to clarify the meaning of this word as used in the art of accounting. After long consideration, this committee formulated the following definition and comments:

"Depreciation accounting is a system of accounting which aims to distribute the cost or other basic value of tangible capital assets, less salvage (if any), over the estimated useful life of the unit (which may be a group of assets) in a systematic and rational manner. It is a process of allocation, not of valuation. Depreciation for the year is the portion of the total charge under such a system that is allocated to the year. Although the allocation may properly take into account occurrences during the year, it is not intended to be a measurement of the effect of all such occurrences."

Reference to and careful consideration of this definition will help resolve depreciation problems in connection with contractor's equipment. Often contractors purchase equip-

Concrete is swung by a Bucyrus-Erie 11-B to wood forms for a culvert under a detour road near Calhoun, La. The construction is being done in conjunction with an interchange project along Interstate 20. The transit crane, equipped with 35-foot boom, is also used to pull the culvert forms.

Montana's Madison River, blocked in the August 17 earthquake, now has a 4,000-foot spillway to keep water from topping the slide and starting a washout. The next job, on which this D8 is helping, is moving a million yards of earth to prevent spillway erosion while a stilling basin is built.

ment for a specific job, and on completion of that job, dispose of the equipment, rather than retain it for future work. In these circumstances, the useful life of the equipment to the contractor, and therefore the accounting period for depreciation allocation is the term of the job—say, two years—and not the physical life of the equipment, which may be ten years. The amount to be depreciated should be its total cost, less its estimated salvage value at time of disposal.

Depreciation methods

A number of methods for allocating depreciation have come into use over the years, the most common of which is the so-called straight-line method under which the cost, less salvage value, is equally allocated over the estimated useful life of the equipment. Although such methods as the "declining-balance" and "sum-of-the-years' digits" had a long history of prior use in England and other countries, their specific recognition for income-tax purposes in the United States suggested their particular consideration by the accounting profession in this country. The institute committee on accounting procedure stated that such methods met the defined requirements of being "systematic and rational," and then concluded as follows:

"In those cases where the expected productivity or revenue-earning power of the asset is relatively greater during the earlier years of its life, or where maintenance charges tend to increase during the later years, the declining-balance (or sum-of-the-years' digits) method may well provide the most satisfactory allocation of cost."

The committee recommends that when either of these accelerated methods is used for income-tax purposes, but not for financial accounting, and the amounts are material, that accounting recognition should be given to deferred (i.e., postponed) income taxes. The further suggestion is made that the tax-deferred amounts should not be recognized as a liability but rather as additional amortization or depreciation applicable (and deductible) to such assets

(*Continued on next page*)

"Fetch me those other sets of prints, Miss Jarvis, and shake it up, please."

Blueprint "life" test compares file systems

■ A unique test cycle of blueprint "life" has recently been completed by Momar Industries, Chicago. It was undertaken in order to learn how much longer than ordinary files the firm's Glider blueprint files retain prints in good condition. Tape, color-coded and with filing reference information, was attached to prints. Plans, estimated to have relatively the same frequency of use, were equally divided between regular files and Gliders.

Four years later, the following record was tabulated: of the original 120 plans drawer-filed, 92 are in usable condition; six of the 28 in question are obsolete, and were placed in a morgue file; seven had to be reproduced due to tears from closing drawers and six, because of temporary misplacement in the file. When the originals were eventually located, they were discarded in favor of the more recent reproductions. Nine could not be traced and were replaced.

Of the 120 Glider-filed prints, 114 are in good condition and still in use. One was never returned from a customer; five are obsolete. None were lost or damaged.

The direct-clamp plan holders of the Glider can take up to 100 prints each. Each plan holder has a self-contained tee-top that glides in or out of full-length channels attached to the top of the file.

(*Continued from preceding page*)

where it is reasonably presumed that the accumulative difference between financial and taxable income will continue for a long or indefinite period.

It may be desirable in some circumstances to supplement a contractor's financial statements with a footnote explaining the depreciation policies observed.

One can hardly refer to the general subject of equipment costs and depreciation accounting without mentioning the accounting profession's point of view toward inflation and its impact on capital assets. Certainly the general effects of inflation on construction costs in recent years have made this subject a day-to-day problem in the contracting business.

Observing that this matter is one of continuing importance, the institute committee has concluded that no basic change in the accounting treatment of depreciation of plant and equipment was practicable or desirable under present conditions to meet the problem created by the decline in purchasing power of the dollar.

The commitee did, however, support the use, where appropriate, of supplementary financial schedules, explanations, or footnotes as a means of informing stockholders, employees, and the general public of a business need to retain, out of profits, amounts sufficient to replace productive facilities at current prices if it were to stay in business.

(*Continued next month*)

Steel rail piles show three advantages on foundation job

Three steel rail sections, welded along the base edges, form a new type of foundation pile for the Pueblo Savings & Trust Co. building in Pueblo, Colo. The piles were able to go through the tough soil more easily than conventional ones, and helped cut foundation costs and job time.

A new type of foundation pile, made from three steel rail sections welded along their base edges, saved time and money on the construction of the new Pueblo Savings & Trust Co. building in Pueblo, Colo. The piles, fabricated by the Houston Division of L. B. Foster Co., were easily driven through tough soil filled with boulders and permitted the contractor to get in and out in only four days.

A rail pile was used because its rigidity would enable it to punch through the tough soil more readily than would conventional piles; it would produce a foundation for at least $10,000 less and about two months earlier than caissons could do the job; and it would be available immediately.

As soon as the general contractor, Whitlock Construction Co., Pueblo, had excavated the top 14 feet of the site, the subcontractor, Hutcheson Construction Co., Englewood, Colo., moved in. A Link-Belt 12K diesel hammer, riding in 62-foot-long leads from a Manitowoc 2000 crane, drove the piles. A conventional follower block was used between hammer and pile, with the addition of a short shaft, welded to the block, that projected into the core of the rail pile to keep the block centered.

Fast driving

Piles were driven about 22 feet through the bouldered site to refusal in hard shale, known locally as Denver formation. The subcontractor recorded 20 to 25 blows per inch at refusal, with no damage to the pile.

Of the 83 piles needed on the job, most ranged from 20 to 32 feet long and weighed 52 pounds per foot. Heavier sections up to 90 pounds per foot were driven in areas where the highest pile capacities were required.

In cross section, the rail pile is a hollow equilateral triangle with rail heads extending 120 degrees outward. The design takes advantage of the high-tensile, yield, and compressive strengths of rail steel. The shape gives the piles a general symmetrical section so that its section modulus is about the same around any axis, providing high resistance to forces from any direction.

The heaviest concentration of metal in the pile is at the rail heads, which are the flanges of the section. Special welding techniques for fabricating the pile were developed by L. B. Foster Co., Pittsburgh.

THE END

The federal-aid apportionment for the expanded national highway program for fiscal year 1961 amounts to $2,725,000,000. Of this, $1.8 billion will be for the Interstate System and $925 million for primary and secondary systems and urban extensions.

Tricks of the Trade

Hook holds truck to finisher and keeps bituminous mix from spilling onto grade

A hook that grabs a rear truck axle automatically, and can be quickly and easily released by hand, holds the truck in firm contact with the bituminous paver while the load of mix is being dumped. This job-built device was designed and installed by Carlson-Lein Co., Rapid City, S. Dak., on its Barber-Greene finishers and Blaw-Knox shouldering machines to eliminate the spillage of the bituminous mixture between the truck and the paver.

While this spillage is not too serious where the paver operator and truck driver work carefully, it does occasionally occur and may result in a loss of time if the spilled material must be cleaned up by hand. The hook device eliminates the possibility of such accidents.

On its bituminous-paving operations, Carlson-Lein uses a fleet of specially adapted new GMC 450 dump trucks equipped with extra "tag" axles in the rear. These extra axles provide a convenient and uniform member for the hook to engage.

As the truck backs into position in front of the paver, the pivoted hook rides up over the axle and then drops down to positively engage it. In this position, the truck cannot pull away from the paver.

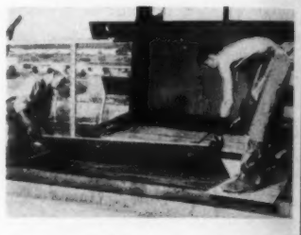
When the load has been dumped, the truck driver touches his brakes. This gives the hook a little slack. A workman actuates a lever at the side of the paver to raise the hook off the axle and allow the truck to pull away. On the company's new Barber-Greene SB-60 paver, the hook is disengaged by a foot-operated lever. On the Blaw-Knox shouldering machine, the release is effected by a hand-actuated lever. Both methods provide a quick and easy release.

The device operated perfectly for Carlson-Lein Co. during extensive bituminous-paving jobs near Gillette, Wyo., and Broadus, Mont.

Coat concrete form panels five times faster than usual with dipping technique

Slice 13 minutes off a 15-minute operation that has to be repeated a number of times, and you've saved a lot of construction time.

That's what Engstrum & Nourse, San Francisco building contractors, did by using a dipping technique that



coats concrete form panels with sealer five times faster than the conventional brushing method.

Engstrum & Nourse set up a trough of 18-gage steel at the site of two new 6-story dormitories for San Francisco State College. The buildings, which total 127,000 square feet in area, required 8,000 cubic yards of concrete. The trough, 5×10×1-foot deep, was sheltered by a roof and, at the rear, had a sloping metal shelf equipped with three notched stringers to support up to 25 panels.

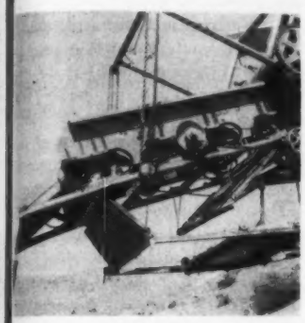
The panels used were ¾ and ⅝-inch B-B PlyScord in 4×6 and 4×10-foot sizes. Two men worked at the dipping trough, which was filled to a depth of several inches with Burke form-sealer dipping formula. Panels, stacked in front of the trough, were dipped one at a time and allowed to soak up the solution for as long as three minutes. If panels had been brushed with the sealer, it would have taken up to 15 minutes to coat each one, and the brushing would not have produced as good a result, particularly on the edges of the panels.

After panels were dipped, they were stacked to drain on the rack and the drippings ran back down into the trough. At the end of a run, the panels were restacked horizontally, and stickers were inserted between them to permit all surfaces to dry. By the following morning, they were ready for repiling without stickers, and ready for use on the job.

ding gate under grizzly end of conveyor-loader events damage to trucks

A simple sliding gate that closed e opening under a grizzly prevented mage to cabs, windshields, and odies of haul units on a highway ading job outside of Salt Lake ity, Utah.

Part of the work on the 5-mile sec- on of Interstate 15 called for 1.1 illion yards of borrow to build up mbankments. In one of the pits, ntractor Gibbons & Reed Co., Salt ake City, used a Kolman belt loader o feed material to the bottom-dump



railers making the haul to the em- bankment. Oversize material was creened out by a vibrating bar rizzly and fed into a truck.

One of the early problems with his operation was the damage caused y rocks that held up temporarily in he grizzly and then fell out just as truck pulled underneath with a ottom-dump trailer. After trying everal corrective measures, the con- ractor's shop came up with a sliding ate to close the opening under the rizzly between loads. The gate was perated by a 4-foot-long air cylinder nd rode on rollers supported on the ower flange of the grizzly frame.

arrel carried by finisher olds tools, keeps them clean

A simple method of storing, as well s cleaning, hand tools for an as- phalt-paving crew is utilized by P. A. Bradbury Construction Co., Aber- deen, S. Dak.

The rakes and shovels are held in a drum, containing diesel fuel, which hangs on the side of their Barber-Greene finisher. The diesel fuel washes off asphalt that clings per- sistently to the tools. The container was made by welding two hooks to the side of an open 50-gallon drum.

The photo was taken during work on a 17-mile project on U.S. 281 north of Aberdeen.

INDEX TO ADVERTISERS

Labor Review

Laborers' hiring arrangements in southern California hit by NLRB examiner

Alleged discrimination against nonunion laborers seeking jobs in the southern California construction industry gave rise to a series of charges against the union, four employer associations, and a number of construction companies, and led NLRB Examiner Howard Myers to recommend that a sweeping Brown-Olds dues repayment order be issued by the board.

The consolidated case concerns the master labor agreement between the Southern California District Council of Laborers and the Associated General Contractors, the Building Contractors Association, the Engineering and Grading Contractors Association, and the Home Builders Institute.

Myers heard a long recitation of complaints by workmen who said they were denied work or removed from jobs because they were not members of the laborers local within jurisdiction of the project at which they applied for work or were employed.

Myers recommended that the parties cease enforcing the master labor agreement, that the charging individuals have lost wages made good, and that all employees be reimbursed for dues, initiation fees, etc. Brown-Olds liability would be shared by the four associations, contractors, the Laborers District Council, and 21 local unions.

Boilermakers wrap up field construction pact in Southeastern states

The boilermakers announce conclusion of their fifth and final area agreement for field construction. Workmen in the Southeastern states received a 15-cent raise in hourly pay December 1, raising the journeyman scale to $3.75 throughout the seven-state area, except in southern Florida.

A 10-cent-an-hour health-welfare contribution is carried over, and the settlement provides that employers will begin paying one cent per hour per man into an apprenticeship and training fund January 1, 1960.

Mediation continues in Glen Canyon dispute over subsistence pay

Merritt-Chapman & Scott Corp. and five striking unions were called back into mediation sessions aimed at ending a three-and-a-half months' work stoppage at Glen Canyon Dam.

Carpenters, cement masons, teamsters, laborers, and operating engineers walked out July 5 after the contractor refused to make subsistence payments for work at Glen Canyon on the grounds that its national agreements with the unions do not require subsistence pay, and that adequate living facilities have been provided at the project.

A compromise settlement, under which the contractor would pay an additional 50 cents hourly in lieu of subsistence, was reported earlier. But the U. S. Interior Department, which is obligated to pay 85 per cent of the cost of any wage increase on reclamation projects, said it could not commit the government to pay the estimated $4¼ million that would be its share of the 50-cent wage increase.

According to an MC&S spokesman, the Interior's Bureau of Reclamation since has clarified the initial refusal to indicate that while it could not approve a request for funds based on a proposal, it might view a signed agreement differently. It is noted that the department's initial statement said that "the government would be willing to give consideration to a sharing of wage costs over and above those specified in the existing Arizona union agreement on some reasonable basis," but emphasized that it would take no position on issues in dispute between contractors and unions.

Technical engineers sign new agreement with Alaska contractors

The American Federation of Technical Engineers report a new agreement with the Associated General Contractors, Alaska Chapter, covering about 300 surveyors employed on construction projects.

The agreement is retroactive to March 15, but little work was available during a four-month carpenters' strike that brought most projects to a standstill. The technical engineers and other unions in the industry settled following the carpenters' acceptance of a new contract with AGC in September.

Like most of the new agreements, AFTE's will run for two years, with a March 15 anniversary date, and an additional raise due as the Alaska construction season gets underway next spring.

New rates for AFTE members are reported as follows: party chief, $5.06; instrumentman, $4.53; lead chainman, $4.26; and rear chainman, $4.10.

In addition, the contract calls for these differentials: 10 per cent of the base rate for flying time to jobs; 50 cents to $1 extra for travel time, bringing the range to $3.50 daily for 20 to 26 miles, and to $6.75 for over 48 miles; a 25-cents-per-100-foot differential for tower work; and a 10 per cent differential for tunnel or underground work.

Distributor Doings

B-E distributor news

The W. W. Williams Co., Columbus, Ohio, is a new exclusive dealer for Bucyrus-Erie Co., South Milwaukee, Wis. The firm is handling the B-E line for all of Ohio through five sales and service outlets.

S. M. Christhilf & Son, Inc., Timonium, Md., has added Hydrocrane machines to the line of excavating and crane equipment that it distributes for B-E. The dealer is at Timonium Road and Harrisburg Expressway.

Service plant opened for GM Diesel line

A new $100,000 plant for the sales and service of the GM Diesel all-purpose power line has been opened at 5840 Colorado Blvd., Denver, Colo., by Dobbs GM Diesel, Inc. O. L. Dobbs is president; Dick Jeffries, sales manager; Glenn Donaldson, parts manager; and Earl Goble, service manager.

B-L-H distributorship

Road Machinery & Supplies Co., 213 Fifteenth St. N., Fargo, N. Dak., is a new distributor for Lima shovels, cranes, draglines and pull-shovels, and the Lima Roadpacker.

The distributor covers the entire state of North Dakota and three counties in Minnesota for Baldwin-Lima-Hamilton Corp., Construction Equipment Division, Lima, Ohio.

Ryan Equipment expands

Ryan Equipment Co. will move into new quarters on its present site at 3350 Morganford Road, St. Louis. The new 2-story facility includes expanded sales, service, and storage areas.

Mayer elected partner of Edward R. Bacon Co.

Herbert J. Mayer, executive vice president of Western Machinery Co., San Francisco, has been elected a partner of the Edward R. Bacon Co., also of San Francisco, and assumes the post of general manager of that company. He also continues as a director of Western Machinery and as executive vice president in charge of its machinery-distribution business.

Daybrook names dealers

Florida Trailer & Equipment Co., 3160 W. Beaver St., Jacksonville, Fla., has been named a sales and service representative for Power Loaders produced by the Daybrook Hydraulic Division, Young Spring & Wire Corp., Bowling Green, Ohio.

Kanawha Rail & Machinery Corp., 6304 MacCorkle Ave. S. E., Charleston, W. Va., has been appointed to carry the complete line of Daybrook truck equipment. The dealer will cover a 33-county area in the central and southern parts of the state.

Pacific Mercury names

Lee Equipment Corp., 33 Island St., Boston, Mass., has been appointed a stocking distributor of electric plants manufactured by Pacific Mercury Mfg. Corp., Van Nuys, Calif.

Parker-Hannifin news

Poe Hardware & Supply Co., 556 Perry Ave., Greenville, S. C., has been named a distributor for industrial tube and hose fittings produced by Parker Fittings & Hose Division, Parker-Hannifin Corp., Cleveland.

Also appointed to handle the same line of fittings is Midwest Fluid Power Co., 4325 Harris St., Toledo, Ohio.

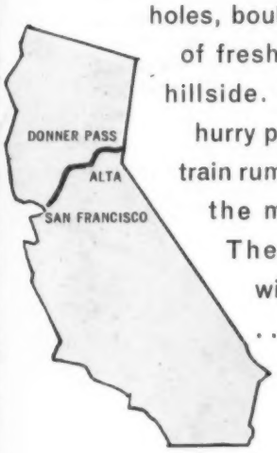
New Midwest dealer for McKiernan-Terry

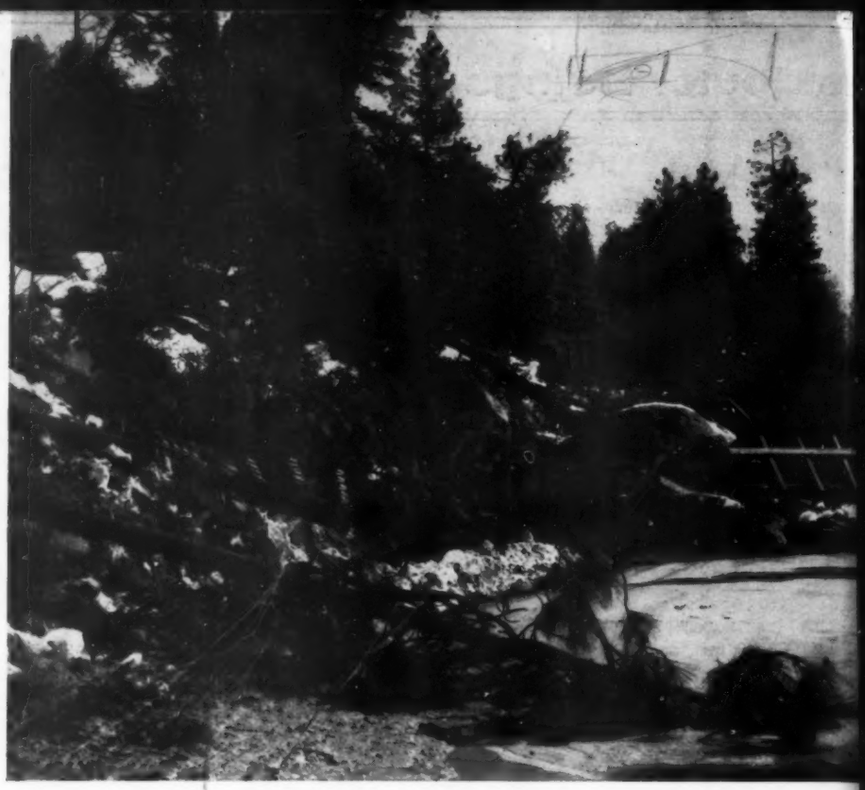
The Construction Equipment Division of McKiernan-Terry Corp., Dover, N. J., has a new Iowa dealer —Gierke-Robinson Co., Davenport and Des Moines. Its territory is northwestern Illinois and central and eastern Iowa. Gierke-Robinson will handle the division's complete line of pile hammers and extractors, McKiernan-Clayton steam generators, and sand-drain equipment.

Curtiss-Wright division names new distributor

Lee H. Long Associates, Inc., 54 Washington St., Wellesley Hills, Mass., has been appointed a distributor for the complete line of construction machinery made by the South Bend Division, Curtiss-Wright Corp., South Bend, Ind. The dealer will cover Maine, New Hampshire, Rhode Island, and eastern Massachusetts.

In the rugged mountain country of eastern California, U. S. Highway 40 twists and curves past the little towns of Colfax, Alta, Baxter and Emigrant Gap on its way east to Donner Pass. Tall pines, mud holes, boulders and patches of fresh snow cover the hillside. Cars and trucks hurry past; a long freight train rumbles by further up the mountain slope. Then . . . a cold wet wind stirs the trees . . the earth grunts, shifts . . . and . . . ROCK SLIDE!!!





Giant mud slide blocks U.S. 40. Traffic stopped 'til Michigan goes to work

4-yd Tractor Shovel clears huge boulders

Early last winter, 100,000 cubic yards of mud, rock and earth tore away from a mountain-top near Alta, Calif. The muddy wave toppled trees and sucked up boulders—picked up speed as it tumbled down to Highway 40—dumping its load across the road shoulders and pavement.

To put ruffled nature back in place, the State of California, Division of Highways, called for bids. J. O. Archibald Company, general contractor from Redwood City, was awarded the job.

Archibald rushed his normal earth-moving fleet of scrapers, tractors, shovels and trucks to clear the highway, and to stabilize the hillside by terracing. But as they cleared away mud and rock, volcanic ash and sandstone, work crews came across giant boulders that required special treatment. Archibald didn't want to blast any more rock than necessary. Blasting would add to the cost of the project. Hoses and compressors would slow earth-moving. And any more vibration might set off another slide!

Special rock, special tool

So Archibald scanned his equipment roster, then selected a Tractor Shovel that in four passes was loading out 18 and 20 yard haul trucks. His machine—a Michigan Model 275A—swung a big bucket, all right. Four yards. But big enough to handle the big rock? Say a boulder 10 feet in diameter?

It became Operator F. E. "Mac" McKinsey's job to find out. Mac had put in lots of time on Archibald's 2¼-yd Michigans—also had clocked almost 200 hours on the new 4-yd Model 275A. But that was more-or-less straight truck-loading work. What could the 275A do halfway up a mountainside, working in treacherous, muddy footing, on steep slopes, moving boulders as required to a gully half a mile away.

Carries 8 tons, dozes 10

Under these conditions, the Michigan went to work. First, the operator edged Michigan's bucket lip under a typical giant boulder. Then, careful work of the hydraulic controls gently raised and tipped the bucket as operator felt his way under the huge rock. If the boulder could be lifted, more than likely it could be carried. And it was, load kept low—just off the ground.

So the job continued, the Michigan by itself moving a stream of 8 to 10 ton boulders to the dump area. Even when a rock was too big to see over, Michigan carried it . . . the operator simply driving in reverse. Power steer and identical speeds forward and reverse made this easy. Other times, when boulders weighed over 10 or 11 tons, or when one was so odd-shaped it couldn't be carried in the bucket, the 262 hp Michigan simply *dozed* it the half mile to the edge of the gully.

Could the ability to handle 4 yds—lift up to 11 tons per pass—help solve *your* production problems? To help you judge for yourself, we'll be glad to show you a Model 275A in action. Call to arrange time and place.

Powerful Michigan works bucket under 10-ton boulder, lifts, and away goes the huge load.

Michigan is a registered trademark of
CLARK EQUIPMENT COMPANY

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